











THE  
ZOOLOGY  
OF THE  
VOYAGE OF H.M.S. EREBUS & TERROR,  
UNDER THE COMMAND OF CAPTAIN SIR JAMES CLARK ROSS, R.N., F.R.S.,  
DURING THE YEARS  
1839 TO 1843.

BY AUTHORITY OF THE LORDS COMMISSIONERS OF THE ADMIRALTY.

EDITED BY

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VOL. II.  
REPTILES, FISHES, CRUSTACEA, INSECTS, MOLLUSCA.

LONDON:  
E. W. JANSON, 28, MUSEUM STREET, W.C.  
M.DCCCXLIV. M.DCCCXLV.





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# REPTILES.

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## I. — THE REPTILES OF AUSTRALIA.

DR. SHAW, in the Appendix to White's 'Journal of a Voyage to New South Wales,' in 1790, first described and figured some of the Reptiles observed by White in New Holland. Some of the specimens he brought home having been placed in the collection of the British Museum, were more systematically described by the same naturalist in his 'General Zoology,' and his work on the Animals of New Holland.

Lacepède, in the 'Annales du Muséum,' (iv. 18), described several Reptiles from the same country, and redescribed several of those which had been already noticed by Shaw and White.

Capt. Flinders, in his 'Voyage to Terra Australis,' 1814, mentions the occurrence of two kinds of Turtles (*Chelonia*) one on the north coast of New Holland (ii. 154), and the other on the east coast (ii. 382).

Peron and Lesueur, during their voyage with Captain Baudin on the coasts of Australia, collected many specimens of this class of animals, which were deposited in the Museum of the Garden of Plants, and a few of which were noticed by Opper in preparing the Reptile part of Cuvier's 'Règne Animal.' Others have been described by Messrs. Duméril and Bibron, in their 'Erpetologie Générale,' now in the course of publication. Some others were described by me during my visit to Paris, when I was preparing the Synopsis of Reptiles, which appeared in Griffith's translation of Cuvier's 'Animal Kingdom,' which must only be considered as an abstract of the notes prepared for my 'Synopsis Reptilium.'

In the Appendix to Capt. Philip Parker King's 'Voyages in Australia,' I described some new species discovered by that navigator, especially the very curious Frilled Lizard, which is figured in that work. From time to time, as specimens from that country have been kindly presented to the Museum by different collectors, as my late friend Allan Cunningham, Mrs. Joseph Wright, and others, I have described the specimens in the 'Proceedings of the Zoological Society,' and other scientific periodical publications.

In the Appendix to His Excellency Capt. George Grey's Australia, I attempted to bring together these scattered materials, and formed a list of the different species which had been described as coming from Australia, adding to it descriptions and figures of the new Australian species, chiefly sent home by Governor Grey and Mr. Gilbert, from the west coast, then in our collection; and since that time I have, in my 'Zoological Miscellany,' described several additional species, which have, in the mean time, been sent to England from the north coast of Australia by Mr. Gilbert, who is employed by Mr. Gould to collect specimens for him in different parts of that continent.

In the Zoology of the Voyages of the French ships, l' *Uranie*, la *Coquille* and l' *Astrolabe*, some Australian Reptiles have been figured and described by MM. Quoy and Gaimard and M. Lesson; but unfortunately, though the descriptions of the specimens are long and apparently full, yet they are so general, and the figures of the species, though good for artistic effect, are so destitute of scientific detail, that it is often impossible to determine which of the Australian species they are intended to represent; and the specimens from whence they were described, do not appear to be in the collection of the French Museum, for MM. Duméril and Bibron do not refer to them in their work.

In the Appendix to Dr. Dieffenbach's New Zealand, I described the Reptiles he had brought from those islands; Mr. Bell, in the 'Zoology of the Beagle,' has described and figured another species from the same country, which was brought home by my friend, Mr. Darwin: and another species has since been discovered by my nephew, Lieut. Alexander Smith, R.N., who accompanied the Antarctic Expedition.

## Order I. LIZARDS, (SAURIA).

Mouth not dilatable. Jaws toothed. The lower jaw-bones being united by a bony suture in front. Eye with distinct eyelids. Drum of the ears generally distinct, exposed. Nostrils lateral, nasal cavities separated by a long cavity. Limbs 4, distinct, rarely in such a rudimentary state as to be hidden under the skin. Toes generally distinct, clawed, for walking or climbing. Body elongate, rounded, covered with imbricate granular scales. Ribs distinct, mobile, and with a distinct sternum. Tail elongate, tapering, rarely prehensile, generally covered with whorls of scales. Egg with a hard skin. Young not undergoing any metamorphosis.

The GRYPHI, containing the *Ichthyosauri*, *Plesiosauri*, the recently discovered *Rhyncosauri*, and other Lizard-like fossils of the lias and new red sandstone, which have nearly the same formation of the skull, the pendant ear-bones &c. of the Sauria, are easily distinguished from them by their doubly cupped vertebrae and usually paddle-like feet, like Cetacea amongst Mammalia.

## Sect. I. SQUAMATA.

Body covered with overlapping or granular scales. Nostrils lateral. The skull formed of separate bones. The nasal cavities separated by a bony septum. The ear-bone external, pendent, and only articulated to the skull. Tongue free, elongate, nicked at the tip, often entire. The lungs free in the cavity of the thorax. The vent a linear cross slit. The male organ and vagina forked. Vertebrae with a convex surface fitting into a concave surface in the preceding joint. Oviparous, rarely viviparous. The eggs when deposited covered with a more or less coriaceous shell.

## Sub-order I. LEPTOGLOSSÆ.

## Tribe I. CYCLOSAURA.

Scales of the belly square (very rarely rhombic, keeled), in cross bands, of the back and tail rhombic, imbricate, or circular and subgranular, placed in cross rings, of the sides generally granular, rarely like the back. Tongue elongate, flattened, base sometimes sheathed, generally free, only attached to the gullet by a long frenum, with two elongate cylindrical horny tips. Tail elongate, with whorls of scales, generally conical, tapering, sometimes compressed, with two elevated crests above.

## Family. MONITORIDÆ.

Head with minute polygonal shields. Teeth adnate to the inner side of the jaws. Tongue elongate, slender, retractile into a sheath at its base. Scales small, roundish, placed in cross rings, those of the sides like those of the neck. Legs 4, strong. Toes 5-5, compressed, subequal. Thighs poreless. Superorbital plate bony. Old World, near water.

The species of this family are confined exclusively to the Eastern World and Australasia. Of the twenty-two species described in the Catalogue of the Lizards in the British Museum, the last complete work on the species of Reptiles that has appeared, six are peculiar to Australia,

eleven are found in India, Borneo and New Guinea, and five in Africa.

## 1. Tail round without any keel above. Terrestres.

## ODATRIA, Gray.

Nostrils ovate, longitudinal, subanterior. Teeth compressed, acute. Tail elongate, round, not keeled above. Scales large, sharply keeled, subspinose. Back with elongate, narrow, keeled scales. Ventral shield elongate. Toes rather unequal, elongate.

This genus is easily known from the terrestrial Monitors of Africa, by the larger size and keeled form of the caudal scales.

Besides the Australian species, there is one, *O. Timorensis*, from the Island of Timor, first described by me in Griffith's Animal Kingdom, ix. 36.

The DOTTED ODATRIA. *Odatria punctata*.

## Plate 1.

*Odatria punctata*, Gray, *Ann. N. H.* ii. 394. *Grey's Trav. Austr.* ii. 422. *Cat. Rept. B. M.* 7.  
*Monitor tristis*, *Schlegel, Abbild.* 73.

Grey olive, with narrow, black, reticulated lines, bearing large hexagonal spots; head, limbs and tail blackish, with a few pale spots, dark-banded; ventral shield twice as long as broad; tail round; scales over the eye small, granular; male? with a tuft of conical spine-like scales on each side of the vent.

The young is blackish, with cross rings of white spots; head closely white speckled; limbs white dotted. Very young grey, with numerous narrow dark cross bands. Inhabits West Australia and Port Essington.

The EYED ODATRIA. *Odatria ocellata*.

## Plate 2.

*Odatria ocellata*, Gray, *Cat. Rept. B. M.* 8.

Black, with rather large yellow rings; limbs and tail yellow-spotted; tail round; scales of the tail broad, oval, spinose; scales over the eyes small, granular; ventral shields twice as long as broad.

Inhabits N.W. coast of Australia. Benjamin Bynoe, Esq., R.N.

Like *O. punctata*, but the scales of the back, and the spinose scales of the tail are much larger. The scales of the back are bluntly keeled, of the tail square, nearly as broad as long, sharply and strongly keeled, spinose; in *O. punctata* they are nearly twice as long as broad, and only subspinose.

## 2. Tail triangular, compressed, and with a doubly toothed crest above. Nostril small, round.

## MONITOR, Gray.

*Polydædalus*, *Wagler*. *Uranus*, *Fitz.*

Nostrils small, round, in the middle between the apex of the muzzle and the front angle of the eye. Tail elongate, compressed, with a double-edged keel above. Toes elongate, unequal, strong. Teeth rounded.

## GOULD'S MONITOR. Monitor Gouldii.

## Plate 3.

Monitor Gouldii, *Schlegel. Gray, Cat. Rept. B. M. 12.*  
*Hydrosaurus Gouldii, Gray, Ann. N. H. i. 394. Gray's*  
*Trav. Austr. ii. 422.*

With 2 yellow streaks on the side of the neck; scales over the eyes small, granular, of forehead larger; ventral shields small, longer than broad.

Inhab. Western and North-western coast of Australia.

HYDROSACRUS, *Wagler.*

Tupinambis, part, *Fitz.*

Nostrils oblong, longitudinal, near the apex of the muzzle. Tail elongated, with a double-edged keel above. Toes unequal, elongate. Teeth compressed, sharp-edged, denticulated.

This genus is divided into two sections; some have the scales over the orbit small and equal, others have a series of larger ones in the middle of the small ones. All the Australian species belong to the former division. The second section contains two species; one, *M. bivittatus*, found in India, Borneo and the Philippines, the other, *M. prasinus*, at New Guinea.

\* Scales over the orbit equal. Neck with lunate bands.

The LACE LIZARD. *Hydrosaurus varius.*

*Lacerta varia, Shaw, White's Journ. N. S. W. 246, t. 3, f. 2. Nat. Misc. iii. t. 83.*

*Uranus varius, Merrem, Tent. 58. Dum. et Bib. E. G. iii. 491. Gray, King's Voy. ii. 427.*

*Tupinambis variegatus, Dand. Rept. iii. 76. Kuhl, Beytr. 125.*

*Hydrosaurus varius, Wagler, Syst. 164. Gray, Ann. N. H. i. 394. Cat. Rept. B. M. 12.*

Grey, with black cross bands, which are lunated over the nape; scales of the orbit very small, equal.

Inhab. New Holland.

BELL'S LACE LIZARD. *Hydrosaurus Bellii.*

*Uranus Bellii, Dum. et Bib. E. G. iii. 493, t. 35, f. 1. Gray, in Gray's Trav. Austr. ii. 422.*

*Hydrosaurus Bellii, Gray, Cat. Rept. B. M. 13.*

Pale, body and tail with broad black cross bands; scales of the orbits dilated, equal.

Inhab. Australia??

This species is only known from a specimen in Mr. Bell's collection, and one in the Paris Museum.

\*\* Scales of the orbit equal, small. Neck spotted like back.

The GIGANTIC LACE LIZARD. *Hydrosaurus giganteus.*

## Plate 4.

*Hydrosaurus giganteus, Gray, Cat. Rept. B. M. 13.*

Brown, back and tail with cross bands of large black-edged white spots; neck and under side of body pale, with large black round reticulations; legs white-spotted; toes

rather short, strong; shields of the head subequal, convex, over the orbits very small, granular.

Inhab. N. coast of New Holland.

The largest species of the genus. The specimen in the British Museum is 78 inches long. It was discovered and described by Capt. Stokes, R.N.

## Tribe II. GEISSOSAURA.

Scales of the belly and (almost always) of the back and sides, rounded, quincuncial, imbricate, formed of a more or less thick, vascular, bony plate, covered with a thin epidermis, often showing the vessels through it. Sides rounded, covered with scales like those of the back. Tongue narrow, short, flat, slightly nicked at the end. Head covered with regular many-sided shields (rather scale-like in *Lialis*). Neck not contracted. Body fusiform or subcylindrical. Femoral pores none, (except in *Pygopus* and *Lialis*).

A. Eyes distinct, exposed. Eyelid rudimentary. Head conical.

## Fam. GYNOPTHALMIDE.

Nostrils lateral, in a single nasal plate, without any supranasal above it. Teeth conical, simple. Palate toothless. Tongue scaly, nicked at the tip. Eyes naked. Eyelids rudimentary, circular, ring-like, and immovable. Ears distinct. Body fusiform. Limbs 4, weak, unequal. Femoral pores none.

CRYPTOPHEPHARUS, *Cocoteau, Weigmann.*

Ablepharus, part, *Dum. et Bib.*

Head pyramidal. Frontoparietal plate single. Nostrils lateral, in a single nasal, supranasal none. Eyelid rudimentary, circular. Ears moderate, open, denticulated in front. Tongue flat, scaly, nicked at the tip. Palate toothless. Body fusiform. Scales smooth, or very finely and indistinctly grooved. Legs 4. Toes 5-5, unequal, rather compressed. Tail roundish, tapering, acute. Preanal scales in three rows.

\* Eyelid complete, with a series of larger scales above.

The PETE. Cryptoblepharus Boutonii.

*Scincus plagioccephalus, Peron, Mus. Paris.*

*S. Boutonii, Desjard. Ann. Sci. Nat. xxii. 298.*

*S. arenarius, and S. furcatus, Schlegel, Mus. Leyd.*

*S. aureus, Mus. Paris.*

*Cryptoblepharus Peronii, Coct. Scincoides, i. t. Mag. Zool. i. Dum. et Bib. E. G. v. 813.*

*C. Leschenaultii, Coct. Sciu. i. t.*

*C. Boutonii, Gray, Cat. Rept. B. M. 64.*

*Ablepharus pœcilepleurus, Weigmann, N. Act. N. Cur. xv. 183, t. 8, f. 1. Gray, Ann. N. H. ii. 335. Gray's Trav. Austr. ii. 426. Seba, Thes. ii. t. 2, f. 9-10.*

*Tiliqua Buchanani, Gray, Ann. N. H. ii. 291.*

Olive or bronzed, brown-varied. Scales black-streaked. Eyelid circular, scaly, with the three upper scales largest. Ears moderate, suboval, open, simple-edged. Rostral plate very large, triangular. Preanal plates 6 or 7, nearly equal.

Inhab. Western Australia, the Isle of France, Timor.

\*\* *Eyelid incomplete, no scales between the eye and eyebrow above.*

The EYED PETE. *Cryptoblepharus lineo-ocellatus.*  
Plate 5, fig. 1.

*Ablepharus lineo-ocellatus, Dunn. et Bib. v. E. G. 817.*  
*Cryptoblepharus lineo-ocellatus, Gray, in Grey's Trav. Austr. ii. 427. Cat. Rept. B. M. 65.*

Back grey or reddish, with 4 series of white-edged black spots, and edged with a pale streak, and a black-edged white streak on each side. Upper lip white. Eyelid circular, covered with small equal scales, without any between the eye and superciliary plates. Rostral plate small, very broad, 6-sided. Frontal plate broader than long. Ears moderate, suboval, with 2 or 3 denticulations in front. Head short.

Inhab. Swan River, W. Australia.

MORETHIA, Gray.

Head pyramidal. Frontoparietal shields rough. Nostril lateral, in a small shield with a small supranasal above it, and a smaller nasolateral shield behind it. Eyelid rudimentary, circular. Ears moderate, open, denticulated in front. Body fusiform. Scales smooth. Legs 4, weak. Toes 5-5, unequal, rather compressed. Tail roundish, tapering, acute. Preanal scales rather large.

This only differs from *Cryptoblepharus* in the nasal shields. It is as if the nasal shield of that genus was divided into three small plates.

The MORETHIA. *Morethia anomalus.*

Plate 5, fig. 2.

*Morpethia anomalus, Gray, Cat. Rept. B. M. 65.*

Olive bronzed, black-spotted; eyelid scales equal; ears with 3 or 4 small denticulations in front.

The young have a dark-edged white streak on the sides.

Inhab. Western Australia.

MENETIA, Gray.

Head subquadrate. Muzzle rounded. Rostral plate moderate. Nostril lateral, in an oblong nasal shield; supranasal none; frontoparietal shield single, rhombic. Eyes moderate; pupil round. Eyelid rudimentary, circular. Ears small, covered with the scales. Body elongate, fusiform, subcylindrical, rounded on the sides. Scales smooth. Legs 4, weak. Toes 4-5, slender, rather compressed, unequal, clawed. Tail cylindrical, tapering.

The MENETIA. *Menetia Greyii.*

Plate 5, fig. 3.

*Menetia Greyii, Gray, Cat. Rept. B. M. 66.*

Olive bronzed, with a narrow streak externally edged with a very narrow black line.

Inhab. West Australia.

I have dedicated this genus to Capt. George Grey, the Governor of South Australia, who has exerted himself to make us acquainted with the animals of the Australian continent.

MICULIA, Gray.

Head conical. Muzzle rounded. Rostral plate rather larger, with a straight edge behind. Nostrils lateral in the middle of 2 transverse nasal scales, edging the back of the rostral; supramasal none; frontoparietal shield double. Eyes moderate; pupil round. Eyelids rudimentary, circular, granular. Ears none visible. Body subcylindrical, rounded on the sides. Scales smooth. Legs 4, weak. Toes 4-4, slender, rather compressed, simple, unequal, clawed, the two middle front subequal, longest, the third hinder very long. Tail cylindrical, tapering.

The MICULIA. *Miculia elegans.*

Plate 5, fig. 4.

*Miculia elegans, Gray, Cat. Rept. B. M. 66.*

Olive, with a dark streak on each side, with a narrow white edge below; beneath pale whitish; tail brown-dotted; eyelid interrupted above.

Inhab. Western Australia, Mr. Gilbert.

b. *Head wedge-shaped. Rostral rather produced.*

LERISTA, Bell.

Muzzle rather wedge-shaped. Rostral plate large, bent back on the upper and lower part of the muzzle. Nostril lateral, in a large nasal plate; supranasal none. Eyelid rudimentary, circular, granular. Ears distinct, very small. Palate with a slight triangular nick behind. Scales smooth. Tail conical. Legs 4. Toes 2-3, unequal, clawed, subcylindrical, simple. Preanal plates 2. "The ear-hole is so small that it was overlooked by Mr. Bell."

The LERISTA. *Lerista lineata.*

*Lerista lineata, Bell, Pr. Z. Soc. 1833, 99. Zool. Journ. v. 393, t. 26, f. 2. Gray, Ann. N. H. ii. 335. Cat. Rept. B. M. 66. Dunn. et Bib. E. G. v. 825.*

Greenish grey, with 2 black streaks.

Inhab. New Holland.

Only known from a single specimen in the collection of Mr. Bell.

Fam. PYGODÆ.

Head pyramidal, shielded, short, with 2 or 3 pair of narrow frontal shields, similar to and behind the nasal shield, with 2 large vertebral shields. Nostrils oblong, in a ring-like shield, in the lower angle of the band-like transverse nasal, appearing in the suture between the outer angle of the nasal, the front loreal shield and the lower labial plates. Throat covered with small scales. Teeth conical simple. Palate toothless, with a broad longitudinal groove. Tongue flat, scaly in front, velvety behind, rounded and nicked at the end. Ears distinct, exposed; tympanum sunk. Eyelid rudimentary, circular, immoveable, scaly. Body cylindrical, elongate. Ventral shields broad behind, in 2 or 4 series. Tail with 3 series of broader shields, the central broadest. Limbs 2, posterior, rudimentary, undivided, scaly, on the sides of the vent.

PYGORUS, *Fitz., Merrem.*Bipes, *Cuv.* *Hysteropus*, *Dum. et Bib.* (!)

Head short, truncated, rounded. Rostral plate large, with 2 parietal and a pair of occipital plates. Pupil circular. Scales of the back keeled. Ear ovate. Vent with a series of pores in front. Hinder limbs elongate, ovate, compressed, scaly. Tail cylindrical, rather tapering.

The PYGORUS. *Pygopus lepidopodus*.*Pygopus lepidopodus*, *Gray, Cat. Rept. B. M.* 67.Bipes lepidopodus, *Lacép. Ann. Mus. H. N.* iv. 193, 209, t. 55, f. 1. *Schinz, Abbild.* t. 12, f. 2.*Pygopus lepidopodus*, *Merrem, Tent.* 77.*Hysteropus lep.* *Bory, Res. Erpet.* 142, t. 27, f. 2.H. Novæ Hollandiæ, *Dum. et Bib. E. G.* v. 828, t. 55.Sheltopusik Novæ Hollandiæ, *Oppel, Rept.* 40.

Coppery grey, with 5 series of oblong, 4-sided, white-edged, black spots and some oblique black streaks on the side of the neck; muzzle with 2 pair of broad transverse frontals, similar in shape to the nasals.

Inhabits Australia.

The SCALY-FACED PYGORUS. *Pygopus squamiceps*.

Plate 8, fig. 3. Animal and head.

*Pygopus squamiceps*, *Gray, Cat. Rept. B. M.* 68.

Muzzle with 5 series of frontal plates; grey, with a series of small spots on each side.

Inhab. W. Australia.

I have only seen a single specimen; it may only prove a monstrosity of the former, with which it agrees in most characters, except those above mentioned.

DELMA, *Gray.**Pygodactylus*, part, *Weig.*

Head elongate, shielded, with 2 parietal and a pair of large occipital shields. Rostral plate transverse, moderate. Eye circular; pupil elliptical, erect. Ears ovate, open, simple-edged. Body subcylindrical. Tail tapering. Scales smooth. Hinder limbs short, scaly. Vent without any pores in front.

FRASER'S DELMA. *Delma Fraseri*.*Delma Fraseri*, *Gray, Zool. Misc.* 14. *Gray's Trav. Aus.* ii. 427, t. 4, f. 3. *Cat. Rept. B. M.* 68.

Olive, head white, with 4 more or less confluent black bands; sides of neck white-spotted, beneath white.

Inhab. New Holland.

## FAM. APRASIIDÆ.

Nostrils small, in the suture between the top of the front upper labial and the anterior frontal. Head small, half conic, shielded. Muzzle rather produced, acute. Frontals large, 2 pair, covering the cheeks. Vertebral shield large, elongated, 6-sided. Superciliary shields 2 pair, small. Labials few, large. Eyelid rudimentary, circular, edged with a series of small scales. Pupil round. Ears hidden under the scales. Body and tail cylindrical, tapering, covered with hexagonal scales and rather broader ventral shields. Limbs none.

APRASIA, *Gray.*

Limbs none. Scales smooth.

By some mistake, the slip containing the description of this genus in my Synopsis of Slender-tongued Saurians, (*Ann. N. H.* ii. 362), accidentally got into the wrong place, with *Tiliqua*, instead of being near *Anguis*.

The APRASIA. *Aprasia pulchella*, *Gray, Ann. N. H.* ii. 332. *Gray's Trav. Austr.* ii. 428—438, t. 4, f. 2. *Cat. Rept. B. M.* 68.

Pale brown, with a series of brown spots, one spot in the centre of each scale; sides with the spots more connected, forming interrupted streaks; lips yellow.

Inhab. Western Australia.

## FAM. LIALISIDÆ.

Head covered with rather imbricate scales. Cheeks scaly. Muzzle flattened in front. Nostrils in the hinder edge of a small nasal shield, in front of the face-ridge. Eyelid rudimentary, circular, scaly. Pupil elliptical, erect. Ears distinct. Body elongate, subcylindrical. Scales oval, smooth, imbricate. Belly with 2, tail with 1, series of larger shields. Limbs 2, posterior, short, undivided, flat, scaly. Tail rather tapering, elongate. Vent with a series of pores in front, each placed in the front edge of a scale.

LIALIS, *Gray.*

The only genus.

BURTON'S LIALIS. *Lialis Burtoni*, *Gray, Proc. Z. Soc.* 1834, 134. *Gray's Trav. Austr.* ii. 437, t. 3, f. 1. *Zool. Misc.* 52. *Cat. Rept. B. M.* 69. *Dum. et Bib. E. G.* v. 831.

Above grey olive, in spirits, with 5 rather interrupted brown longitudinal streaks, the central streak divided into two over the nape, and united together again over the nose; the outer lateral streaks narrowest and more interrupted, edged with the two colours; beneath blackish grey, with large white spots; lips and streak under ear and along the side of the neck white.

Inhab. Western Australia and Houtman's Abrolhos.

The TWO-LINED LIALIS. *Lialis bicatenata*.

Plate 7, fig. 1.

*Lialis bicatenata*, *Gray, Zool. Misc.* 52. *Cat. Rept. B. M.* 69.

Above brown grey, in spirits, with a series of distant black spots (one on the centre of each scale) along each side of the back; top of the head and nape with an indistinct double band, forming an elongated loop; beneath blackish grey, whitish dotted; chin and throat blackish, white-spotted; lip-shields brown.

Inhab. Western Australia? May be only a variety of *L. Burtoni*, but very differently coloured.

The DOTTED LIALIS. *Lialis punctulata*.

Plate 8, fig. 1.

*Lialis punctulata*, *Gray, Zool. Misc.* 62. *Cat. Rept. B. M.* 69.



Brownish grey, very minutely black-dotted, beneath darker brownish grey, the two colours separated by a very narrow brown edge and a distinct white line; side of the head and neck dark chocolate brown, edged above with a very narrow, and beneath by a broader white band; front upper and side lower labial plates white, the rest dark brown.

Inhab. North Coast of New Holland, Port Essington.

The body is much thicker and shorter than in either of the other species; the tail is reproduced, so that it is not possible to refer to its comparative length.

I have seen, but cannot procure to examine, what appeared to be a fourth species of this genus, from Australia, with a larger head.

*B. Eyes distinct, eyelids distinct, valcular. Head conical.*

Fam. SCINCIDÆ.

Head subquadrangular, regularly shielded. Rostral plate moderate, erect, sometimes rather produced and transversely keeled. Nostrils lateral in a more or less large nasal shield, with sometimes a supranasal over it, between the nasal and internasal. Body fusiform and subcylindrical. Tail cylindrical or tapering. Scales smooth, keeled, or striated. Limbs 4, more or less strong, sometimes wanting, or rather hidden under the skin. Femoral pores none.

1. *Scales thin, smooth, not striated nor keeled, unarmed. Nasal flat, smooth, without any lunate groove behind the nostril. Tail round, tapering, unarmed.*

B. *Toes compressed, simple. Head subquadrangular. Rostral erect, triangular. Nostril in the middle of the nasal shield. Lygosomina.*

a. *Supranasal plate none. Body fusiform. Lower eyelid covered with scales. Frontoparietal separate.*

HINULIA, Gray.

Lygosoma, part, *Dum. et Bib.* Le Keneux, part, *Cocteau*.

Frontal plate oblong. Rostral erect, triangular. Palate toothless, with a deep triangular notch in front. Body fusiform. Scales smooth, thin; the 2 central preanal scales larger than the rest. Tail tapering, roundish. Legs moderate. Toes 5-5, slender, compressed. Heel of the hind feet surrounded with granules.

\* *Ears simple in front, roundish.*

GERRARD'S HINULIA. *Hinulia Gerrardii*.

Plate 9.

*Hinulia Gerrardii, Gray, Cat. Rept. B. M. 75.*

Silvery grey (when dry), with a broad irregular brown band across the back of the neck, with a streak to the occiput, and a broader one to each fore leg; body with 6, tail with 12 or 14 broad crescent-like cross brown bands, which are spotted with grey when they cross the side; limbs with brownish streaks; head brown above, head-shields black-edged, with a brown streak on the temple, towards the ear; chin white, brown-lined, belly brown-spotted; ear open, simple in front, partly covered by the

temple-scales; supraocular plates 3-3, nasal nearly contiguous, frontoparietal contiguous. Length 14 inches.

Inhab. Australia.

The ELEGANT HINULIA. *Hinulia elegans*.

Plate 10, fig. 1.

*Hinulia elegans, Gray, Cat. Rept. B. M. 75.*

Pale brown, back varied with black spots, more close, forming an irregular broad dark streak on the upper part of each side, beneath whitish; chin varied with black; lips and limbs blackish varied; nasal and frontonasal nearly contiguous; ears ovate, open, simple-edged.

Inhab. New Holland.

The SWAN RIVER HINULIA. *Hinulia Greyii*.

Plate 10, fig. 2.

*Hinulia Greyii, Gray, Cat. Rept. B. M. 75.*

Olive, black-varied, with a dark-edged yellow streak on each side of the back; sides black-spotted, with a yellow streak below; legs brown-streaked; lip-shields black-edged; ears oblong, smooth-edged; frontal triangular, elongate, frontonasal contiguous, frontoparietal and parietal small, similar; body thick, fusiform.

Inhab. Swan River.

Named in honour of Capt. George Grey, the Governor of South Australia, who discovered the species.

The SLENDER HINULIA. *Hinulia tenuis*.

Plate 10, fig. 3.

*Tiliqua tenuis, Gray, Griffith, A. K. ii. 71. Ann. N. H. ii. 291.*

*Scincus erucatus, Peron, Mus. Paris.*

*Lygosoma erucata, Dum. et Bib. E. G. v. 726.*

*Kenex de Busseuil, Coct. Tab.*

*Hinulia tenuis, Gray, Cat. Rept. B. M. 76.*

Pale brown, varied, with an irregular-edged brown streak on each side; scales in 8 series; feet long, toes very slender; muzzle rather short; supraocular shields 4; ears round, open, simple-edged; nostrils lateral, nasal triangular, frontonasal nearly contiguous; tail elongate, rather compressed.

Var. with sides white-speckled.

Inhab. W. Australia, Swan River.

The BRONZED HINULIA. *Hinulia inornata*.

Plate 10, fig. 4.

*Hinulia inornata, Gray, Cat. Rept. B. M. 76.*

Pale nearly uniform brown bronze above, back with a rather narrow bright yellow rather darker-edged streak on each side; the sides pale, with an indistinct yellow streak on the lower part of each, both streaks extending along the side of the tail; chin and beneath whitish, with rather darker edges to the sides; ears oblong, with 4 or 5 small compressed yellow scales in front.

Inhab. Swan River.



The LINEATED HINULIA. *Hinulia tæniolata*.*Hinulia tæniolata*, Gray, *Cat. Rept. B. M.* 78.*Lacerta tæniolata*, Shaw, *White's Jour. N. H.* t. 32, f. 1. Gray, *Griiffith*, A. K. ix. 68. *Ann. N. H.* ii. 289. *Dum. et Bib. E. G.* v. 734.*Scincus undecim-striatus*, Kuhl, *Beytr.* 129.*S. octolineatus*, Daud. *Rept.* iv. 285.*S. multilineatus*, Lesson, *Voy. Cog.* t. 3, f. 2.Keneux de Lesueur, *Coc. Tab.*

Brown or black, with 6 white streaks, continued and margining the shields of the head; sides brown, with 2 white streaks; tail pale, with 3 tapering streaks; nasals contiguous; scales of the back in 4 series; ears denticulated in front; frontonasal plates contiguous.

Inhab. Australia.

In the British Museum there is the specimen first described by Dr. Shaw, which was brought by Capt. White.

WHITE'S HINULIA. *Hinulia Whitei*.

Plate 11, fig. 1.

*Hinulia Whitei*, Gray, *Cat. Rept. B. M.* 79.*Scincus Whitei*, Lacc. *Ann. Mus.* iv. 192.*S. ocellatus*, and *S. Lewisiensis*, Peron, *Mus. Paris.**S. tæniolatus quadrilineatus*, Merrem, *Tent.* 72.*S. moniliger*, Valenci. *Mus. Par.**Lygosoma monilifera*, Dum. et Bib. *E. G.* v. 736.Keneux de White, *Coc. Tab.**Tiliqua leucopsis*, Gray, *Ann. N. H.* ii. 291.

Pale olive, back with a central pale streak, and a regular white-spotted black streak on each side; sides white-spotted; eyelid and ear-lobes white; lips black-varied; scales of the back as long as broad, in 8 series; nasal plates contiguous; ears strongly denticulated in front; frontonasal plates contiguous.

Inhab. Houtman's Abrolhos.

Var. 1. Dorsal streaks each with 2 rows of linear white specks.

Inhab. Swan River.

A stuffed specimen has a central reddish streak on the back.

The NEW ZEALAND HINULIA. *Hinulia ornata*.

Plate 11, fig. 2.

*Hinulia ornata*, Gray, *Cat. Rept. B. M.* 77.*Tiliqua ornata*, Gray, *Dieff. N. Z.* ii. 202.

Bright pale brown, varied with black and white spots; sides with an irregular narrow pale streak above; scales with short black streaks, some black on each side, white in the centre; ears moderate, roundish, simple-edged.

Brown, with black and white spots.

Brown, with 3 blackish streaks, sides blackish, edged above and below with an irregular edged pale line.

Inhab. N. Zealand.

\*\* Ears denticulated in front.

† Scales moderate, in 4 series.

LABILLARDIERE'S HINULIA. *Hinulia Labillardieri*.

Plate 11, fig. 3.

*Hinulia Labillardieri*, Gray, *Cat. Rept. B. M.* 77.Keneux de Labillardiere, *Coc. Tab.*

*Tiliqua Labillardieri*, Gray, *Ann. N. H.* ii. 289. *Dum. et Bib. E. G.* v. 734.

Bronze green, speckled or lined with black; sides black, white-dotted, and with 2 white streaks; nasals rhombic, large, nearly contiguous, frontonasal plates separate; ears ovate, slightly denticulated in front; scales of the back large, in 4 series.

Young, in spirits. Bronze green, with a series of round white spots in the black on the sides of the back.

Inhab. W. Australia.

The AUSTRALIAN HINULIA. *Hinulia australis*.

Plate 11, fig. 4.

*Hinulia australis*, Gray, *Cat. Rept. B. M.* 78.*Tiliqua australis*, Gray, *Ann. N. H.* ii. 291.

*Lygosoma Lesueurii*, Dum. et Bib. *E. G.* v. 733. Gray, *Grey's Trav. Austr.* ii. 425.

Pale brown, with a central white-edged brown streak; sides black, with a narrow white streak above, a series of oblong white spots, as if formed of an interrupted streak, and a rather wide indistinct pale streak below; ears half-ovate, with 4 strong teeth in front; temple white, brown-spotted; scales of the back in 4 series.

Var. 1. Back pale, with a white-edged central streak. Back with several white-edged streaks.

Inhab. Houtman's Abrolhos. Mr. Gould's collection.

Var. 2. Back brown, without a streak.

Inhab. W. Australia and Port Essington.

GILBERT'S HINULIA. *Hinulia Essingtonii*.

Plate 7, fig. 2.

*Hinulia Essingtonii*, Gray, *Cat. Rept. B. M.* 78.*Tiliqua Essingtonii*, Gray, *Zool. Misc.* 51.

Pale brown, nape with 3 indistinct black streaks, with a very distinct narrow broadly black-edged silvery streak from the back angle of the eye to over the base of the tail, and with a broader more indistinct streak from the front to the hinder legs; sides of throat brown, white-spotted; chin, under side of limbs and beneath, yellow; tail elongate, brown, with 2 narrow black streaks on each side; limbs brown, with 3 indistinct black-dotted lines; ears large, with 3 small scales on the front edge.

Inhab. Port Essington, North coast of Australia.

Like the preceding, but it has no white-edged central streak, and the lateral streak has indications of a white border to its upper edge.

- b. *Supranasal plate none. Body fusiform. Lower eyelid with a transparent disk.*

Mocoo, Gray.

Lygosoma, part, *Dum. et Bib.*

Head subquadrangular. Rostral erect, triangular, convex. Nasal lateral, nearly contiguous, supranasal none, frontoparietal separate or united into one. Palate toothless, micked behind. Ears oblong, slightly denticulated in front; tympanum deep. Lower eyelid with a central transparent disk. Chin with several pairs of large shields. Body fusiform. Scales smooth, with 3 or 4 black streaks. Limbs 4, strong. Toes 5-5, compressed, unequal. Tail round, tapering, unarmad. Central preanal scales rather larger than the others.

\* *Fronto-parietal plate single, lozenge-shaped.*

† *Scales of the back moderate, in 6 series.*

GUICHENOT'S MOCO. Mocoo Guichenoti.

Plate 7, fig. 3.

Mocoo Guichenoti, *Cat. Rept. B. M.* 80.

Lygosoma Guichenoti, *Dum. et Bib. E. G. v.* 713. Gray, *Gray's Trav. Austr.* ii. 425.

Bronze green, with a blackish streak on each side; scales of the neck moderate; frontoparietal plate single, larger, elongate, lozenge-shaped, frontal triangular, equal-sided; nasal plate small, quite lateral, internasal broad, truncated in front; ear large, nearly circular, open, simple-edged in front; two of the four scales of the last preanal series larger than the rest.

Inhab. King George's Sound.

There is, in the British Museum, a specimen of this species which was sent from Paris by M. Bibron, under the name of *Scincus Duperregii*, the name which he has applied to the next species in his work. The same kind of error is observable in the other specimen sent at the same time. I should not have observed this mistake, if it did not explain some of the errors into which he has accused me of falling, such as considering his *Scincus Vosmaeri* the same as my *Hagria*, (see *Erp. Gen.* v. 762); my genus and species being absolutely described from his specimen so named, lent to me for the purpose by M. Bibron!

THE NEW HOLLAND MOCO. Mocoo trilineata.

Plate 7, fig. 4.

Mocoo trilineata, *Gray, Cat. Rept. B. M.* 81.

Tiliqua trilineata, *Gray, Ann. N. H.* ii. 291.

Lygosoma Duperregii, *Dum. et Bib. E. G. v.* 715.

Olive, black-spotted, with a pale streak on each side, sides blackish, white-dotted; ears moderate, oval, front edge covered with 2 scales; nasal lateral, nearly contiguous, frontoparietal plate single, lozenge-shaped, frontal rhombic, short and blunt before, long and acute behind.

Var. 1. Olive, scales of the back and sides black-edged, not spotted.

Var. 2. Olive, black and white spotted, sides blackish, white-dotted.

Inhab. S. Australia.

†† *Scales of the back small, in 8 or 10 series.*

THE BLACK-CHINNED MOCO. Mocoo melanopogon.

Plate 7, fig. 5.

Mocoo melanopogon, *Gray, Cat. Rept. B. M.* 80.

Olive, varied with black, and with 2 or 3 white streaks in some of the scales; side of the head and neck black, with a white streak under the eyes from the back edge of the ear; chin and throat black, with a central white spot on each scale, beneath silvery; nasal lateral, frontonasal contiguous; scales of the back rather small, in 8 or 10 series, of the sides smaller; disk of lower eyelid very large.

Inhab. Port Essington.

††† *Scales of the back very small, in numerous series.*

THE EYED MOCO. Mocoo ocellata.

Plate 7, fig. 1.

Mocoo ocellata, *Gray, Cat. Rept. B. M.* 81.

Olive, varied with numerous sometimes confluent black dots, forming rings on the sides, beneath whitish; scales very small, in many series; nasal rhombic, lateral; disk of lower eyelid large.

Inhab. Australia.

\*\* *Interparietal plates 2, separate.*

† *Ear oval, partly covered with the scales above.*

ENTRECASTEAUX'S MOCO. Mocoo Entrecasteauxii.

Plate 7, fig. 2.

Mocoo Entrecasteauxii, *Gray, Cat. B. M.* 82.

Lygosoma Entrecasteauxii, *Dum. et Bib. E. G. v.* 717.

Olive, back with a broad blackish central streak, sometimes with series of spots on the side, sides blackish, with 2 narrow white streaks; nasal plates small, nearly contiguous; temple covered with large scales; transparent disk of the lower eyelid very large; ears moderately open, nearly equal; frontoparietal plate double, frontonasal nearly contiguous.

Inhab. Australia.

THE MOKO MOCO. Mocoo Zelandica.

Plate 7, fig. 3.

Mocoo Zelandica, *Gray, Cat. Rept. B. M.* 82.

Tiliqua Zelandica, *Gray, Dieff. N. Z.* ii. 202.

Tiliqua Moko, *Gray, MSS. Dum. et Bib. E. G. v.* 718.

Pale brown, bronzed, with 2 narrow black-edged bright streaks on each side, the lower one continued down the front of the legs; sides blackish; the frontonasal nearly contiguous, frontoparietal separate, similar to the parietal, nasal nearly contiguous; ears moderate, nearly circular, simple-edged; preanal scales nearly equal, larger; palpebral disk moderate.

Inhab. Cook's Straits, New Zealand, Bay of Islands.

*A List of the Saurians of Australia and New Zealand.* By ALBERT GÜNTHER, M.A., M.D., PH.D.,  
F.R.S., V.P.Z.S., *Keeper of the Zoological Department of the British Museum.*

In the year 1845, when the publication of the *Zoology of the "Erebus and Terror"* was discontinued, Dr. Gray had already prepared some of the materials for the second part of the account of the Reptiles, and the plates intended for it had been drawn on stone and the majority of them printed. These plates remained unpublished until the year 1867, when, considering it a pity that work so beautifully executed and so useful to the Herpetologist should be lost, he determined to render them accessible by publishing them as a collection of figures of Australian Lizards. Thus, then, appeared a fasciculus under the title "*The Lizards of Australia and New Zealand in the collection of the British Museum,*" consisting of a nominal list and eighteen plates. Of these plates, plates 7, 10, 11, and 15 to 19 had not been previously published; the others had already appeared in the *Zoology of the "Erebus and Terror,"* with the exception of plates 5 and 6, of which proofs only had been printed, the drawings having been afterwards inadvertently effaced by the lithographic printer. Having fortunately discovered the proofs of these two plates, with the figures named in Dr. Gray's handwriting, in a collection of miscellaneous drawings given to me by him, I induced the publisher of the present edition to have them re-lithographed by Mr. Ford (the same artist who had drawn the originals), as the figures had been referred to by Dr. Gray in the preceding pages as well as in the "*Catalogue of Lizards.*" Thus I believe, all the figures of Reptiles executed for the "*Zoology of the Erebus and Terror,*" are now before the public.

After the lapse of nearly thirty years, there were serious difficulties in the way of simply continuing the letterpress as originally planned and abruptly terminated on p. 8, and it was finally determined to give a complete list of all the species of Australian and New Zealand Saurians at present known, with references to the principal works and figures and indications of their habitats. Descriptions of a few new species lately received by the British Museum have been added.

CROCODILIA.

1. CROCODILUS POROSUS.

*Crocodylus porosus*, (Schneid.), Günth. Rept. Brit. Ind.  
p. 62.  
Queensland.

2. CROCODILUS JOHNSTONI.

*Crocodylus johnstoni*, Krefft, Proc. Zool. Soc. 1873, p. 334;  
Gray, *ibid.* 1874, p. 177, pl. 27.  
Cardwell, Rockingham Bay.

RHYNCHOCEPHALIA.

3. HATTERIA PUNCTATA. Plate 20.

*Hatteria punctata*, Gray, Zool. Misc. p. 72; Günth, Phil.  
Trans. 1867, pp. 595—629; pls. 26—28.  
New Zealand (North Island).

LACERTILIA.

VARANIDÆ.

4. ODATRIA PUNCTATA. Plate 1.

*Odatria punctata*, Gray, Catal. Liz. p. 7.  
Northern and Western Australia. (Port Essington.  
Perth).

5. ODATRIA SEMIREME.

*Odatria semireme*, Peters, Berl. Monatsber. 1869, p. 65.  
Port Essington, Cape York.

6. ODATRIA OCELLATA. Plate 2.

*Odatria ocellata*, Gray, Catal. Liz. p. 8.  
Northern and Western Australia. (Nicol Bay).

## 7. MONITOR GOULDII. Plate 3.

*Monitor gouldii*, Gray, Catal. Liz. p. 12.  
Queensland; Northern and Western Australia, (Port  
Essington, Shark's Bay); Adelaide.

## 8. MONITOR CHLOROSTIGMA.

*Monitor chlorostigma*, Schleg. Abbild. neu. Amphib. pl.  
22. fig. 6 (head).  
Celebes, Ceram, Borneo, Solomon Island, Cape York.

## 9. HYDROSAURUS VARIUS.

*Hydrosaurus varius*, Gray, Catal. Liz. p. 12.  
Australia.

## 10. HYDROSAURUS BELLII.

*Hydrosaurus bellii*, Dum. & Bibr. Exp. Génér. III, p.  
493, pl. 35, fig. 1; Gray, in Grey, Trav. Austr. II, p. 422.  
North-eastern Australia.

## 11. HYDROSAURUS GIGANTEUS. Plate 4.

*Hydrosaurus giganteus*, Gray, Catal. Liz. p. 13.  
Northern and Southern Australia.

## GYMNOPHTHALMIDÆ.

## 12. CRYPTOBLEPHARUS PECOIOLEURUS. Plate 5, fig. 2.\*

*Cryptoblepharus pecioleurus*, Wiegmann. Nov. Act. Acad.  
Sci. Leop. XV. 1835, p. 202, tab. 18, fig. 1; Günth. Proc.  
Zool. Soc. 1874, p. 296.  
South Sea Islands; Northern, Western and Southern  
Australia. (Adelaide, Swan River).

## 13. CRYPTOBLEPHARUS LINEO-OCCELLATUS.

*Cryptoblepharus lineo-ocellatus*, Gray, in Grey's Trav.  
Austr. II, p. 427.  
Swan River; Kangaroo Island.

## 14. MORETHIA ANOMALA. Plate 5, fig. 1.

*Morethia anomala*, Gray, Catal. Liz. p. 65.  
Eastern, Western and Southern Australia. (Adelaide,  
Sandhurst, Rockhampton).

This lizard differs in nothing from *Cryptoblepharus  
lineo-ocellatus*, except in having the supranasal separated by  
a suture from the nasal; and it appears to me very doubt-  
ful whether the presence or absence of a supranasal can be  
always used as a generic character.

## 15. MENETIA GREYI. Plate 5, fig. 4.

*Menetia greyii*, Gray, Catal. Liz. p. 66.  
Western and Southern Australia, (Adelaide).

## 16. MICULIA ELEGANS. Plate 5, fig. 3.

*Miculia elegans*, Gray, Catal. Liz. pl. 66.  
Western Australia.

## 17. LERISTA LINEATA.

*Lerista lineata*, Bell, Zool. Journ. V. p. 323, tab. 26, fig.  
2; Dum. & Bibr. Exp. gén. V. p. 825.  
Eastern and Western Australia. (Swan River).

## PYGOPOMIDÆ.

## 18. PYGOPUS LEPIDOPUS. Plate 8, fig. 3.

*Pygopus lepidopus*, (Jacép.), Günth. Ann. & Mag. Nat.  
Hist. 1867, XX, p. 45. = *Hydrosaurus nova hollandia*, Dum.  
& Bibr. V. p. 828, pl. 55. = *Pygopus squameiceps*, Gray, Catal.  
Liz. p. 68.  
Western, Southern and Eastern Australia. Rare in  
Tasmania.

## 19. PYGOPUS GRACILIS.

*Pygopus gracilis*, (Mus. Lugd.) = *Phethalar gracilis*, Cope,  
Proc. Ac. N. Sc. Philad. 1874, p. 229.  
South-western Australia.

## 20. DELMA FRASERI.

*Delma fraseri*, Gray, in Grey's Trav. in Austral. II, p.  
427, tab. 4, fig. 3; Günth. Ann. Mag. Nat. Hist. 1873, p.  
145. = *Delma grayi*, Smith, Ill. Zool. 8. Afr. Rept. pl. 76,  
fig. 2. = *Delma mölleri*, Lütken, Nat. Foren. Vid. Medd.  
1862.  
Western and Southern Australia, (Perth, Champion Bay,  
Nicol Bay, Adelaide).

## APRASIDÆ.

## 21. APRASIA PULCHELLA.

*Aprasia pulchella*, Gray, in Grey's Trav. in Austral. II,  
p. 438, tab. 4, fig. 2; Günth. Ann. Mag. Nat. Hist. 1873,  
Aug. p. 145. = *Aprasia octolineata*, Peters, MB. Berl. Acad.  
1863, p. 233.  
Western and Southern Australia, (Swan River, Adelaide).

\* In the original proof of this plate the names attached by Dr. Gray to two of the figures, are evidently confused; he appears to have intended fig. 2  
for *Cr. lineo-ocellatus*, but it is without any doubt taken from a specimen of *Cr. ocellatus* which at the time of the preparation of the plate was  
already in his hands.

## LIALIDÆ.

## 22. LIALIS BURTONI. Plate 8, fig. 2.

*Lialis burtonii*, Gray in Grey's Journ. in Austral. II, p. 437, tab. 3, fig. 1, tab. 5, fig. 4.  
Western Australia, (Houtman's Abrolhos, Champion Bay, Swan River).

## 22A. LIALIS LEPTORHYNCHA.

*Lialis leytorhyncha*, Peters, MB. Berlin Acad. 1873, p. 605.  
Port Mackay.

## 23. LIALIS PUNCTULATA. Plate 8, fig. 1.

*Lialis punctulata*, Gray, Zool. Misc. p. 52, & Cat. Liz. p. 69; Günth. Ann. & Mag. Nat. Hist. 1867, XX, p. 46; Dum. Cat. Rept. 1851, p. 195. = *Lialis bicatenata*, Gray, Zool. Misc. p. 52, & Cat. Liz. p. 69.  
Eastern, Northern and Western Australia, (Sydney, Cape York, Port Essington).

## SCINCIDÆ.

## 24. HINULIA GERRARDI. Plate 9.

*Hinulia gerrardi*, Gray, Cat. Liz. p. 75, = *Hemiphysorodon gerrardi*, Peters, MB. Berl. Acad. 1867, p. 23.  
Queensland, (Rockhampton, Clarence River).

## 25. HINULIA TENUIS. Plate 10, fig. 1 &amp; Plate 11, fig. 3.

*Hinulia tenuis*, Gray in Griff. Ann. Kingd. IX, p. 71, & Cat. Liz. p. 76; = *Lygosoma crucata*, Dum. Bibr. Erp. Gén. V, p. 726; = *Hinulia elegans*, Gray, Cat. Liz. p. 76.  
(Plate 10, fig. 1, *H. elegans*; and plate 11, fig. 3, *H. tenuis*).  
Eastern and Western Australia, (Sydney, Clarence River, Nicol Bay).

## 26. HINULIA GASTROSTICTA, Günth.

Allied to *H. elegans*, but with much smaller scales which form from 38 to 41 longitudinal series round the body, there being 82 scales in a series between the chin and vent. The anterior and posterior frontals and the vertical meet in a point. Ear-opening very wide, ovate, without lobed margin. Tail compressed. A narrow whitish band runs from the supraciliary along each side of the back, disappearing about the middle of the trunk. Upper parts greenish-olive, with scattered black specks of the size of a scale irregularly arranged. Sides of the trunk black, with white specks; sides of the tail black-spotted. Lower parts whitish, with more or less numerous black spots longitudinally arranged.

Four specimens from Kangaroo Island, 11 inches long.		
Distance of snout from vent		93 mm.
" " ear		20 "
Length of fore leg		28 "
" third and fourth fingers		8 "
" hind leg		43 "
" third toe		9 "
" fourth toe		15 "
" fifth toe		8 "

27. HINULIA LABILLARDIERI. Plate 10, fig. 3, (*H. greyii*).

*Hinulia labillardieri* (Coct.), = *Tiliqua labillardieri*, Gray, Ann. Nat. Hist. II, p. 289, = *Lygosoma labillardieri*, Dum. Bibr. Erp. gen. V, p. 731, = *Hinulia labillardieri*, Gray, Cat. Liz. p. 77, = *Hinulia greyii*, Gray, l. c. p. 76.  
Eastern and Western Australia, (King George's Sound, Swan River).

## 28. HINULIA BRANCHIALIS.

*Hinulia branchialis*, Günth. Ann. & Mag. Nat. Hist. 1867, XX, p. 47.  
Western Australia, (Champion Bay).

## 29. HINULIA FASCIOLATA.

*Hinulia fasciolata*, Günth. Ann. & Mag. Nat. Hist. 1867, XX, p. 47.  
Queensland, (Rockhampton, Port Curtis).

## 30. HINULIA STRIATULA.

*Hinulia striatula*, Steindachner, Novara, Rept. p. 49, (*Euprepes striatulus*).  
New South Wales and Western Australia, (Sunday Island).

## 31. HINULIA ORNATA. Plate 11, fig. 1.

*Hinulia ornata*, Gray, in Dieffenb. N. Z. II, p. 201, (*Tiliqua*); and Cat. Liz. p. 77.  
New Zealand.

## 32. HINULIA SCHOMBURGKI.

*Hinulia schomburgki*, Peters, MB. Berl. Acad. 1873, p. 231, (*Lygosoma*).  
South Australia, (Adelaide).

## 33. HINULIA AUSTRALIS.

*Hinulia australis*, Gray, Ann. Nat. Hist. II, p. 291, (*Tiliqua*), and Cat. Liz. p. 77, = *Lygosoma lescurei*, Dum. Bibr. Erp. gen. V, p. 733.  
Western and Southern Australia, (Port Essington, Houtman's Abrolhos, Adelaide).

34. *HINULIA ESSINGTONI*.

*Hinulia essingtonii*, Gray, Cat. Liz. p. 78.  
North Australia, (Port Essington).

35. *HINULIA INORNATA*. Plate 10, fig. 2.

*Hinulia inornata*, Gray, Cat. Liz. p. 78.  
Northern and Western Australia, (Cape York, Swan River).

This species is not always so plainly coloured as the typical specimen; but generally it is ornamented with black, white edged bands, similar in arrangement to those of *H. australis*. It may be considered a variety of this latter species, but with somewhat smaller and more numerous scales which form 30, and in one specimen even 34 longitudinal series round the body, whilst in the true *H. australis* they are arranged in 26 series only.

36. *HINULIA TENIOLATA*.

*Hinulia tenuolata*, (Shaw); White. Journ. pl. 32, fig. 1; Gray, Cat. Liz. p. 78, = *Lygosoma tenuiolatum*, Dunn. Bibr. Erp. gen. V. p. 734, = *Scincus multilineatus*, Less. Voy. Coq. pl. 3, fig. 2.

New South Wales.

37. *HINULIA WHITI*.

*Hinulia whitii*, (Lac.), Gray, Cat. Liz. p. 79, = *Lygosoma moniligerum*, Dunn. Bibr. Erp. gen. V. p. 736.

Australia generally, Tasmania, (Kangaroo Island, Houtman's Abrolhos, Swan River, Adelaide, Sydney, Gayndah, Rockhampton).

38. *HINULIA PANTHERINA*.

*Hinulia pantherina*, Peters, MB. Berl. Acad. 1866, p. 89.  
Swan River.

39. *HINULIA RICHARDSONII*. Plate 11, fig. 2.

*Hinulia richardsonii*, Gray, Cat. Liz. p. 79.  
Western Australia, (Houtman's Abrolhos, Champion Bay).

40. *HINULIA PALLIDA*. Günth.

The prefrontal is in contact with the rostral as well as vertical which is much elongate; the anterior and central occipitals similar in shape and size. Seven upper labials. Thirty-two longitudinal series of scales round the middle of the body. Eighty scales in a longitudinal series between the chin and vent. Ear-opening rather small, without projecting scales in front. Limbs well developed. Upper parts light brownish-olive, very indistinctly marbled with darker. Lower parts white.

Distance of snout from vent	71 mm
" " " ear	14 "
Length of fore limb	19 "
" third and fourth fore toes	5 "
" hind limb	27 "
" third hind toe	6 "
" fourth "	9 "
" fifth "	4½ "

One specimen from Nicol Bay, is in the British Museum.

41. *MOCOA GUICHENOTI*.

*Mocoa guichenoti*, Dunn. Bibr. Erp. gen. V. p. 713 (*Lygosoma*), = *Lygosoma duperreyi*, Dunn. Bibr. l. c. p. 715. = *Mocoa guichenoti*, Gray, Cat. Liz. p. 80, = *Mocoa trilineata*, Gray, l. cl. p. 81.

Southern and Western Australia and Tasmania, (Sydney, Loyalty Island, Swan River).

42. *MOCOA MICROTIS*. Plate 7, fig. 2.

*Mocoa microtis*, Gray, Cat. Liz. p. 83.  
Swan River.

43. *MOCOA OWENII*.

*Mocoa owenii*, Gray, Cat. Liz. p. 272.  
Hab. ?

44. *MOCOA CRASSICAUDA*.

*Mocoa crassicauda*, Hombr. & Jacq. Voy. Austrol. Rept. pl. 4, fig. 1 (*Lygosoma*); Dunn. Cat. Méth. p. 172.  
New Holland.

45. *MOCOA MUSTELINA*.

*Mocoa mustelina*, O'Shaughnessy, Ann. & Mag. Nat. Hist. X111, 1874, p. 299.  
Sydney.

46. *MOCOA OCELLATA*. Plate 7, fig. 3.

*Mocoa ocellata*, Gray, Cat. Liz. p. 82.  
Tasmania.

47. *MOCOA ENTRECASTEALXII*. Plate 7, fig. 5.

*Mocoa entrecasteauxii*, Dunn. Bibr. Erp. gen. V. p. 717. (*Lygosoma*); Gray, Cat. Liz. p. 82.  
Tasmania.

48. *MOCOA METALLICA*.

*Mocoa metallica*, O'Shaughnessy, Ann. & Mag. Nat. Hist. X111, 1874, p. 299.  
Tasmania.



## 49. MOCOA MICROLEPIDOTA.

*Mocoa microlepidota*, O'Shaughnessy, Ann. & Mag. Nat. Hist. XIII, 1874, p. 299.  
Tasmania.

## 50. MOCOA PRETIOSA.

*Mocoa pretiosa*, O'Shaughnessy, Ann. & Mag. Nat. Hist. XIII, 1874, p. 298.  
Tasmania.

## 51. MOCOA PSEUDOTROPIS.

*Mocoa pseudocarinata*, O'Shaughnessy, Ann. & Mag. Nat. Hist. XIII, 1874, p. 300.

The name given by Mr. O'Shaughnessy being a "*vox hybrida*," I have changed it for a better term.  
Tasmania.

## 52. MOCOA ZEALANDICA. Plate 7, fig. 4.

*Mocoa zealandica*, Gray, in Dieffenb. N. Z. II, p. 202, (*Tidiqua*), and Cat. Liz. p. 82, = *Lygosoma moco*, Dum. Bibr. Erp. gen. V, p. 718, = *Mocoa smithii*, Gray, Cat. Liz. p. 82, = *Lygosoma lineo-occlata*, Dum. Cat. méth. p. 169, = *Mocoa variegata*, Buller, Trans. N. Z. Inst. III, p. 6, pl. 2, fig. 2, see Hutton, ibid. IV, p. 168, = *Mocoa striata*, Buller, l. c.  
New Zealand.

## 53. MOCOA (?) LAXA.

*Mocoa (?) laxa*, Hutton, Trans. N. Z. Inst. IV, 1872, p. 169.  
New Zealand.

## 54. MOCOA GRANDIS.

*Mocoa grandis*, Gray, Cat. Liz. p. 272.  
New Zealand, (South Island).

## 54b. LYGOSOMELLA ÆSTUOSA.

*Lygosomella æstua*, Girard, in Wilkes Explor. Exped. XX, p. 251, pl. 28, figs. 1—8.  
New Zealand.

## 55. MOCOA NIGROPLANTARIS.

*Mocoa nigroplantaris*, Peters, MB. Berl. Acad. 1873, p. 744.  
New Zealand.

## 55b. HOMBRONIA UNDOSA.

*Hombronia undosa*, Girard in Wilkes Expl. Exp. XX, p. 240, pl. 27, figs. 17—24.  
New Zealand.

## 55c. HOMBRONIA FASCIOLARIS.

*Hombronia fasciolaris*, Girard in Wilkes Expl. Exp. XX, p. 243, pl. 27, figs. 25—32.  
New Zealand.

## 56. CARLIA MELANOPOGON. Plate 7, fig. 7.

*Carlia melanopogon*, Gray, Cat. Liz. pp. 81 & 272.  
North Australia, (Port Essington).

## 56b. CYCLODINA ÆNEA.

*Cyclodina ænea*, Girard in Wilkes N. Z. Expl. Exp. XX, p. 236, pl. 26, figs. 9—16.  
New Zealand.

## 57. LYGOSOMA AUSTRALE. Plate 6, fig. 3.

*Lygosoma australe*, Gray, Ann. Nat. Hist. p. 332, & Cat. Liz. p. 85, = *Hemidalia gracilipes*, Steindachner, S. B. Wien. Acad. 1870, LXII, p. 342, tab. 5.  
Swan River, Rockhampton, Cape York and Adelaide.

## 58. LYGOSOMA BOUGAINVILLII.

*Lygosoma bougainvillii*, Dum. Bibr. Erp. gen. V, p. 716, = *Lygosoma laterale*, Günth. Ann. & Mag. Nat. Hist. 1867, XX, p. 46.  
South Australia, (Adelaide, Kangaroo Island).

## 59. LYGOSOMA PUNCTULATUM.

*Lygosoma punctulatum*, Peters, MB. Berl. Acad. 1871, p. 646.  
North Australia, (Port Bowen, Cape York).

## 60. LYGOSOMA SCUTIROSTRUM.

*Lygosoma scutirostrum*, Peters, MB. Berl. Acad. 1873, p. 743.  
Port Bowen.

## 61. COPHOSCINCUS OBSCURUS.

*Cophoscincus obscurus*, O'Shaughnessy, Ann. & Mag. Nat. Hist. XIV, 1874, p. 35.  
Queensland.

## 62. TETRADACTYLUS DECRESIENSIS. Plate 6, fig. 4.

*Tetradactylus decresiensis*, (Péron), Gray, Cat. Liz. p. 86.  
Western Australia, (Swan River, Champion Bay, Kangaroo Island). New South Wales, (King George's Sound).

## 63. HEMIERGIS DECRESIENSIS. Plate 6, fig. 5.

*Hemiergis decresiensis*, (Péron), Gray, Cat. Liz. p. 86.  
Swan River and Adelaide.

## 64. HEMIERGIS POLYLEPIS.

*Hemiergis polylepis*, Günth. Ann. & Mag. Nat. Hist. 1867, p. 48.  
South Australia, (Kangaroo Island).

## 65. CHELOMELES QUADRILINEATUS. Plate 6, fig. 2.

*Chelomeles quadrilineatus*, Dum. Bibr. Erp. gen. V, p. 774.  
Western Australia, (Houtman's Abrolhos, Champion Bay, Swan River).

## 66. CHELOMELES RETICULATUS.

*Chelomeles reticulatus*, Günth. Ann. & Mag. Nat. Hist. 1873, p. 146.  
Clarence River.

## 67. OMOLEPIDA CASUARINAE.

*Omolepida casuarinae*, Dum. Bibr. Erp. gen. V, p. 749.  
Tasmania and South-eastern Australia, (Sydney).

## 68. LISSOLEPIS LUCTUOSA.

*Lissolepis luctuosa*, Peters, MB. Berl. Acad. 1866, p. 90, & 1872, p. 776.  
South-western Australia.

## 69. SIAPHOS EQUALIS. Plate 6, fig. 1.

*Siaphos equalis*, Gray, Cat. Liz. p. 89.  
South-eastern Australia, (Sydney).

## 70. ANOMALPUS VERREAUXII.

*Anomalopus verreauxii*, Dum. Cat. méth. p. 185; Peters, MB. Berl. Acad. 1867, p. 24; Günth. Ann. & Mag. Nat. Hist. 1867, p. 47 = *Siaphos simplex*, Cope, Proc. Phil. Acad. 1864, p. 229 = *Anomalopus godeffroyi*, Peters, l. c.  
New South Wales and Queensland, (Brisbane, Clarence River).

## 71. RHODONA PUNCTATA.

*Rhodona punctata*, Gray, Cat. Liz. p. 89 = *Ronia catenulata*, Gray, in Grey's Trav. Austr. II, p. 437, tab. 4, fig. 1 = *Brachystopus lineo-punctulatus*, (Smith MS.) Dum. Cat. méth. p. 186.  
Western Australia, (Swan River).

## 72. RHODONA GERRARDI.

*Rhodona gerrardi*, Günth. Ann. & Mag. Nat. Hist. 1867, XX, p. 46.  
Western Australia, (Swan River, Champion Bay).

## 73. RHODONA PUNCTATO-VITTATA.

*Rhodona punctato-vittata*, Günth. Ann. & Mag. Nat. Hist. 1867, XX, p. 46.  
Queensland.

## 74. OPHIOSCINCUS AUSTRALIS.

*Ophioscincus australis*, Peters, MB. Berl. Acad. 1873, p. 747.  
Port Bowen.

## 75. SORIDIA LINEATA.

*Soridia lineata*, Gray, in Grey's Trav. Austr. II, p. 428, tab. 3, fig. 2, & Cat. Liz. p. 92; = *Photophilus capensis*, Smith, Ill. Zool. S. Afr. App. p. 15; Günth. Ann. & Mag. Nat. Hist. 1873, p. 147.  
Western Australia.

## 76. SORIDIA MIOPUS.

*Soridia miopus*, Günth. Ann. & Mag. Nat. Hist. 1867, XX, p. 370.  
Champion Bay.

## 77. EUMECES ALBOFASCIOLATUS.

*Eumeces albofasciolatus*, Günth. Ann. & Mag. Nat. Hist. 1872, XX, p. 49.

## 78. MABOUIA HIEROGLYPHICA.

*Mabouia hieroglyphica*, Homb. & Jacq. Voy. Pôl. Sud. Rept. pl. 5, fig. 1, (*Lygosoma*); Dum. Cat. méth. p. 166.  
Tasmania.

## 79. MABOUIA MACRURA.

*Mabouia macrura*, Günth. Ann. & Mag. Nat. Hist. 1867, p. 48.  
Cape York.

## 80. BRACHYMELES LEUCKARTII.

*Brachymeles leuckartii*, Weinland, Abhandl. Senckenb. Ges. IV, 1862, p. 140, tab. 5, fig. 3.  
New Holland.

## 80A. NORBEA (?) ISOLATA.

*Norbea (?) isolata*, Hutton, Trans. N. Z. Inst. IV, 1872, p. 170.  
Bay of Plenty.

## 81. TRACHYDOSAURUS RUGOSUS.

*Trachydosaurus rugosus*, Gray in King's Voy. Austr. II, p. 424, & Cat. Liz. p. 102.  
Western and Southern Australia, (Houtman's Abrolhos, Sydney).

## 82. HYDROSAURUS ASPER.

*Trachydosaurus asper*, Gray, Cat. Liz. p. 103.  
Adelaide.

## 83. CYCLODUS GIGAS.

*Cyclodus gigas*, (Bodd.), Gray, Cat. Liz. p. 103; = *Cyclodus boddarti*, Dum. Bibr. Exp. gen. V, p. 752.  
Australia generally and Tasmania. (Port Essington, Sydney, Adelaide, Gayndah).

## 84. CYCLODUS NIGRO-LUTEUS.

*Cyclodus nigro-luteus*, (Wagl.), Gray, Cat. Liz. p. 104;  
Quoy & Gaim. Voy. Uran. Rept. pl. 41. (*Scincus*).  
Tasmania and Houtman's Abrolhos.

## 85. CYCLODUS OCCIPITALIS.

*Cyclodus occipitalis*, Peters, MB. Berl. Acad. 1863, p. 231.  
Adelaide and Swan River.

## 86. CYCLODUS ADELAIDENSIS.

*Cyclodus adalaidensis*, Peters, MB. Berl. Acad. 1863, p. 231.  
Adelaide and Swan River.

## 87. CYCLODUS PETERSII.

*Cyclodus petersii*, Stranch, Bull. Acad. St. Petersburg. 1866, X, p. 449.  
—?

## 88. CYCLODUS FASCIATUS.

*Cyclodus fasciatus*, Lütken, Vid. Medd. 1863, p. 292, tab. 1 & 2, fig. 1.  
New Holland.

## 89. SILUBOSAURUS STOKESII.

*Silubosaurus stokesii*, Gray in Stokes Trav. Austr. & Cat. Liz. p. 104.  
Western Australia, (Houtman's Abrolhos).

## 90. SILUBOSAURUS DEPRESSUS, Günth.

This new species differs from *S. stokesii* in having the hind part of the body and especially the tail strongly depressed and flattened. The scales which in *S. stokesii* are unispinous on the tail, and partly bispinous on the back, are provided with three spines in the present species on the back of the tail as well as of the body, the central spine of each scale being the strongest. Olive-green with irregular black narrow transverse markings or spots. Lower spots whitish, with small blackish spots.

Two specimens from Swan River are in the British Museum; the larger is five inches long.

## 91. EGERNIA CUNNINGHAMI.

*Egernia cunninghami*, Gray in Stokes Trav. Austr. & Cat. Liz. p. 105; = *Egernia krefftii*, Peters, MB. Berl. Acad. 1871, p. 30.  
Southern and Western Australia, (Adelaide, Sydney).

## 92. TROPIDOLEPISMA KINGII. Plate 13.

*Tropidolepisma kingii*, Gray, Ann. Nat. Hist. II, p. 280, & Cat. Liz. p. 106; = *Tropidolepisma dumerilii*, Dum. Bibr. Exp. gen. V, p. 745.  
Western and Southern Australia, (Houtman's Abrolhos, Swan River).

## 93. TROPIDOLEPISMA NITIDUM. Plate 12.

*Tropidolepisma nitidum*, Gray, Cat. Liz. p. 106.  
Western Australia, Queensland, (Swan River, Wide Bay).

## 94. TROPIDOLEPISMA MAJUS. Plate 14.

*Tropidolepisma majus*, Gray, Cat. Liz. p. 107.  
Eastern Australia, (Sydney, Rockhampton).

## 95. TROPIDOLEPISMA STRIOLATUM.

*Tropidolepisma striolatum*, Peters, MB. Berl. Acad. 1870 p. 787.  
Northern Australia.

## 96. TROPIDOLEPISMA RICHARDI.

*Tropidolepisma richardii*, Peters, MB. Berl. Acad. 1869, p. 787.  
Northern Australia.

## 97. TROPIDOLEPISMA DORSALE.

*Tropidolepisma dorsale*, Peters, MB. Berl. Acad. 1873, p. 642, & 1872, p. 775.  
Port Bowen.

## 98. HETEROPUS SCHMELTZII.

*Heteropus schmeltzii*, Peters, MB. Berl. Acad. 1867, p. 23.  
Rockhampton.

## 99. HETEROPUS RHOMBODALIS.

*Heteropus rhombodalis*, Peters, MB. Berl. Acad. 1869, p. 446.  
North-eastern Australia, (Port Mackay).  
Scarcely distinct from *H. fuscus*; without separate central occipital shield.

## 100. OEDURA MARMORATA.

Plate 16, fig. 1 (juv.), and fig. 4.

*Oedura marmorata*, Gray, Cat. Liz. p. 147.  
North-western Australia, (Port Essington).

## 101. OEDURA RHOMBIFERA. Plate 16, fig. 6.

*Oedura rhombifera*, Gray, Cat. Liz. p. 147 = *Phyllodactylus lesueurii*, Dunn. Bibl. Exp. gen. III, p. 392.  
Western Australia.

## 102. OEDURA VERRILLII.

*Oedura verrillii*, Cope, Proc. Acad. Philad. 1869, p. 318.  
New Holland.

## 103. STROPHURA SPINIGERA. Plate 16, fig. 5.

*Strophura spinigera*, Gray, Cat. Liz. p. 148 = *Phyllodactylus strophura*, Dunn. Bibl. Exp. gen. III, p. 307, pl. 32, fig. 1.  
Western and Southern Australia, (Houtman's Abrolhos, Freemantle, Champion Bay, Sydney).

## 104. DIPLODACTYLUS VITTATUS. Plate 16, fig. 3.

*Diplodactylus vittatus*, Gray, Cat. Liz. p. 148.  
Western and Eastern Australia, (Champion Bay, Sydney).

## 105. DIPLODACTYLUS ORNATUS. Plate 16, fig. 2.

*Diplodactylus ornatus*, Gray, Cat. Liz. p. 149 = *Diplodactylus fuscus*, Peters, MB. Berl. Acad. 1863, p. 229, & 1866, p. 446.  
Western and Southern Australia, (Houtman's Abrolhos, Adelaide, New South Wales).

## 106. DIPLODACTYLUS OCELLATUS.

Plate 15, fig. 3, *D. bilineatus*; fig. 4, *D. ocellatus*.  
*Diplodactylus ocellatus*, Gray, Cat. Liz. p. 149 = *Diplodactylus bilineatus*, Gray, l. c. Günth.; Ann. & Mag. Nat. Hist. 1867, XX, p. 49.  
Western Australia, (Champion Bay, Houtman's Abrolhos).

## 107. DIPLODACTYLUS MARMORATUS. Plate 15, fig. 6.

*Diplodactylus marmoratus*, Gray, Cat. Liz. p. 149.  
Western, and Northern Australia, (Kangaroo Island, Swan River, Freemantle, Champion Bay, Houtman's Abrolhos, Norfolk Island, Aneiteum).

## 108. DIPLODACTYLUS POLYOPHTHALMUS.

*Diplodactylus polyopthalmus*, Günth. Ann. & Mag. Nat. Hist. 1867, XX, p. 49.  
Western Australia, (Champion Bay, Nicol Bay).

## 109. STENODACTYLOPSIS TESSELLATUS. Günth.

Back covered with comparatively large flat tessellated tubercles, which on the sides are rather smaller, scale-like and slightly imbricate. Ear opening minute. Lower parts with very small scales. Nine upper and ten lower labials. Chin shield longer than broad, without larger scutes behind. Tail (reproduced) with the scutes in narrow verticelli. Limbs slender, the fore-leg, if stretched forward, reaches to the nostril, the hind-leg to the axil. Whitish with faint irregular brownish spots.

Distance of snout from vent	49 mm.
" " " eye	6 "
" " " ear	13 "
Length of fore leg	19 "
" hind leg	23 "

One specimen in the British Museum from Australia.

## 110. STENODACTYLOPSIS PULCHER.

*Stenodactylopsis pulcher*, Steindachner, SB. Wien. Acad. 1870, p. 343, pl. 2, figs. 3—5.  
Swan River.

## 111. RHYNCHOEDURA ORNATA.

*Rhynchoedura ornata*, Günth. Ann. & Mag. Nat. Hist. 1867, XX, p. 50.  
Nicol Bay.

## 112. PHYLLODACTYLUS ANOMALUS.

*Phyllodactylus anomalus*, Peters, MB. Berl. Acad. 1867, p. 14.  
Queensland, (Rockhampton).  
This species might be referred to *Discodactylus* (Tschudi).

## 113. HEMIDACTYLUS DEPRESSUS. Plate 15, fig. 1.

*Hemidactylus depressus*, Gray, Cat. Liz. p. 153.  
Hab. ?

## 114. HEMIDACTYLUS BROOKII. Plate 15, fig. 2.

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115. *HEMIDACTYLUS VITTATUS*. Plate 15, fig. 5.  
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*Hemidactylus variegatus*, Dum. Bibl. Erp. Gen. III, p. 353.  
 Western Australia, (Houtman's Abrolhos, Champion Bay).
117. *HEMIDACTYLUS PUSILLUS*.  
*Hemidactylus pusillus*, Cope, Proc. Acad. Philad. 1869,  
 p. 319.  
 South-western Australia.
118. *PENTADACTYLUS BRUNNEUS*.  
*Pentadactylus brunneus*, Cope, Proc. Acad. Philad. 1869,  
 p. 320.  
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119. *GECKO TRACHYLEMUS*.  
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120. *GEHYRA AUSTRALIS*.  
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 Western and Northern Australia, (Swan River, Champion Bay, Port Essington, Sunday, Loyalty, and Norfolk Islands).
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*Naultinus granulatus*, Gray, Cat. Liz. p. 273.  
 New Zealand.
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*Naultinus elegans*, Gray, Cat. Liz. p. 169; Buller, Trans. N.Z. Inst. III, p. 8, pl. 2, fig. 1.=*Naultinus sulphureus*, Buller, l.c.  
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 Hab. ?
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130. *PHYLLURUS PLATURUS*. Plate 17, fig. 3.  
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- AGAMIDÆ
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# ICHTHYOLOGY

OF THE

## VOYAGE OF H.M.S. EREBUS & TERROR,

UNDER THE COMMAND OF CAPTAIN SIR JAMES CLARK ROSS, R.N., F.R.S.

BY

SIR JOHN RICHARDSON, KNT., M.D., F.R.S., &c.,

INSPECTOR OF NAVAL HOSPITALS, ETC., ETC.

L O N D O N :

M.DCCC.XLIV.—M.DCCC.XLVIII.

PRINTED BY EDWARD NEWMAN,  
DEVONSHIRE STREET, BISHOPSGATE STREET, LONDON.

# FISHES.

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Monacanthus vittatus (Solander, <i>Balistes</i> )	66	3—7	43
Western Australia.		Western Australia.	
Monacanthus variabilis (Rich.), <i>Aleuterius</i> errone-		Hemiscyllium ocellatum, a scale only, Pl. XXVIII.	
ously, Pl. LIII. f. 1—7	67	f. 8	43
Western Australia.			
Aleuterius paragaudatus (Rich.) Pl. XXXIX. f.		ACANTHIDÆ.	
1—4	66	Acanthias (Müller und Henle), Pl. XXVIII. f. 1, 2*	44
Tasmania. Australia.		Australia.	
Aleuterius maculosus (Rich.) Pl. XXIX. f. 5—7	67		
Tasmania. Australia.		RAIIDÆ.	
Aleuterius trossulus (Rich.) Pl. XL. f. 5, 6	68	Raia lemprieri (Rich.) Pl. XXIII.	34
Western Australia.		Tasmania.	
Aleuterius? brownii (Rich.)	68		
North Australia.		TRYGONIDÆ.	
Aleuterius? baueri (Rich.)	68	Urolophus ephippiatus (Rich.) Pl. XXIV.	35
North Australia.		Tasmania.	
OSTRACIONIDÆ.		PETROMYZONTIDÆ.	
Ostracion boops (Rich.) Pl. XXX. f. 18—21	52	Petromyzon mordax (Rich.) Pl. XXXVIII. f. 3—6	42
Southern Atlantic.		Tasmania.	
TETRAODONTIDÆ.			
Tetraodon virgatus (Rich.) Pl. XXXIX. f. 8, 9	62		
Port Jackson.			

\* Misprinted 5 instead of 1 in p. 44.

Through inadvertence the following omissions were made in the text:—

PHUCOCETES (Jenyns, Ichth. of Voy. of Beagle, p. 168, Pl. XXIX. f. 3).

ILUCOCETES (Jenyns, Ichth. of Voy. of Beagle, sp. 165, Pl. XXIX. f. 2).

Our specimen is not in the best order, and we can add nothing to Mr. Jenyns's account of the genus. It is possible that the species differs from his *latitans*; but not having his specimen at hand for comparison, we have left the matter for future investigation.

HAB. Falkland Islands and Cape Horn.

The above remarks apply also to this fish. Our specimen has a small barbel on each side of the symphysis of the lower jaw, which is not shown in Mr. Jenyns's figure of *L. fimbriatus*, and the dentition seems also to differ, as well as the form of the body; but in the absence of comparison of specimens, we have preferred leaving the matter undetermined.

HAB. Falkland Islands and Cape Horn.

# FISHES.

BY JOHN RICHARDSON, M.D., F.R.S., &c.

IN no expedition that ever sailed from Europe has more care been taken to collect the zoological productions of the sea, than in the pre-eminently scientific one of the Erebus and Terror. The commanding officer, an accomplished zoologist, had previously paid much attention to Ichthyology, and, under his fostering superintendence, ample collections of fish were made at New Zealand, Van Diemen's Land, Australia, Kerguelen's Land, Cape Horn, the Falklands, and wherever an opportunity offered of drawing the seine or trawl, or dropping a hook. The specimens thus obtained filled many casks, and numerous jars and bottles, and it were greatly to be wished that so much industry had met with the full measure of success that it deserved; but we have to regret that, during a voyage protracted for upwards of four years and a half, including every possible change of climate, and during which the ships were buffeted by many severe gales, and sustained innumerable shocks in forcing their way through the ice-packs of the Antarctic Seas, the specimens suffered very severe damage. Owing to the deterioration of the spirits in jars that were crowded with fish, and the long continued action of the brine, where that liquid was employed, very many specimens entirely perished, or merely fragments of skeletons could be rescued from the mass. Yet the present number, which includes only the Gobioid fishes and their allies, is rich in new forms, and will shew the Ichthyologist that enough remains to render the collection as interesting as any that has been made, of late years, in any quarter of the globe. Except what may be gleaned from the notes and drawings of the Forsters, who accompanied Cook on his second voyage, nothing is known of the fish inhabiting the seas beyond the fiftieth parallel of south latitude. Sir James Ross merits the warmest thanks of zoologists for having done so much to supply this want. They are due also to Dr. Joseph Dalton Hooker for his able co-operation with his commanding officer, and for the excellent sketches and notes which he has contributed; as well as to the other officers who lent their aid in forming the collections.

Fam. GOBIIDÆ.

GOBIUS BYNOENSIS. Richardson.

CH. SPEC. *G. quinque-fasciatus maculatusque, punctis coloratis, serialis utrinque in nucha; pinnâ dorsi priori nebulosâ, secundâ lineatâ; pinnis cæteris unicoloribus.*

RADI:—D. 6½—1½; A. 1½; C. 19; P. 21; V. 1½—1 united.

Plate I., fig. 1 and 2, natural size.

This species having canine teeth, will rank in the group which is headed in the *Histoire des Poissons* by *G.*

*venenatus* (12, p. 85.) It is not very dissimilar in its general form to *G. niger*. The specific name has been bestowed in honour of Benj. Bynoe, Esq., Surgeon in the Royal Navy, who, while serving in the Beagle, made extensive collections of Australian animals and plants, which he presented to the Museum of Haslar Hospital.\*

The length of the head is contained four times and a half in the total length of the fish, caudal fin included; its width is less than half its length, but equal to its height,

\* To make the list of Australian species as complete as possible, a few undescribed fish from the western coasts of that country, discovered by the officers of the Beagle surveying ship, have been added to Sir James Ross's collection.

CH. SPEC. *G. capite nuchâque esquamosis; corpore maculoso; pinnis dorsi caudæque seriâtim guttatis; genis, operculis nuchâque lineis mucigenis percursis; poris apertis in preoperculo; dente canino parvo in latere utroque maxillæ inferioris; dentibus interioribus mandibularum brevissimis, scobiformibus, stipatis.*

RADI:—Br. 4 ? D. 6|—1|9; A. 1|9; C. 25; P. 15;  
V. 1|10—1 united.

Plate I, figs. 3 and 4, natural size.

and the cheeks are but little swelled out. The height of the body and length of the head are equal, and exceed the altitude of the first dorsal. This fin has less of the triangular form than is usual in the genus, the five foremost rays differing little in height; the last ray is shorter. The rays of the second dorsal and anal are more than usually numerous. The caudal is widely rounded. The moderately large eyes are the length of the orbit apart from each other, the same distance from the edge of the intermaxillary, and twice as far from the gill-opening. The scales come forward on the top of the head to the orbits, a few clothe the upper border of the gill-cover, but the rest of the head is naked. A row of open pores follows the course of the temporal groove, and three pores exist on the vertical limb of the preoperculum. A raised mucigenous line runs under the eye, and is connected with another, which forms a small circle on the cheek.

The cleft of the mouth scarcely reaches to the fore part of the orbit. It is armed above by an outer row of subulate, slightly curved teeth, to the number of eight or ten on each intermaxillary, and extending about half way to the angle of the mouth. The inner teeth are too small to be easily seen without the assistance of a lens, and stand in a single line, as far as the outer ones extend, but beyond them they are two or three rows deep. On the under jaw the outer row is similar, and of the same extent with the upper ones, but it is terminated on the middle of the jaw on each side by a somewhat larger recurved tooth. The distribution of the interior teeth of this jaw is the reverse of what occurs in the upper one, being in a single row towards the corners of the mouth, and in a double one behind the outer teeth. The strap-shaped tongue is prominent and smooth. There is a pretty broad velum to both jaws, and the palate is smooth, with a mesial fold of membrane.

The scales are moderately large, there being sixty-five in a longitudinal row between the gill opening and caudal fin. Their exposed disks, *in situ*, are exactly rhomboidal, and their borders are finely plaited and ciliated. The gill-opening is entirely lateral, being closed beneath by the broad and directly transverse attachment of the membrane to the isthmus.

The original colours cannot be ascertained from the specimens, which have been long macerated in spirits. The body is marked by dark patches, which appear to have formed about five vertical bands between the gill-opening and caudal. There are blotches high on the back between the bands, a round dark spot at the base of the middle caudal rays, and some dark specks on the snout and other parts of the head; a row of coloured spots runs on each side of the hind head, from the eye to the dorsal. The first dorsal is marked in a clouded manner, with alternate waving dark and light bands; a dark streak traverses the bottom of the second dorsal, and the rest of the fin is occupied by five lines alternately lighter and darker. The extreme edge of the fin is blackish; the anal has likewise a blackish edge, but is without other markings, as are also the pectorals, ventrals, and caudal. Length of the specimen,  $3\frac{1}{2}$  inches.

HAB. Coasts of Western Australia.

This goby agrees so well with the description of the *G. criniger* in the *Histoire des Poissons*, that I have referred it to that species, though I have seen neither authenticated examples nor figures to confirm this determination. The specimen described by M. Valenciennes was obtained at Java by MM. Quoy and Gaimard, and had a tall filiform tip to the second ray of the first dorsal. M. Valenciennes considers this to be peculiar to the male, and refers to the same species an Indian goby which wants this prolongation. It is also wanting in our example, which was taken on the north-west coast of Australia.

The head makes a fourth of the total length, caudal included, and its width at the gills, which exceeds half its length, nearly equals its height. The eyes, large and approximated, interfere with the profile. There are three orifices in the nasal region, the lower of which has a very short tubular lip. The head is entirely scaleless, the nakedness extending backwards on the nape to the first dorsal, but there are some small remote scales deeply imbedded in the skin of the supra-scapular regions. A raised muciferous line, which forks twice, traverses the cheek; two similar lines cross the gill-cover, the lower one being forked; and there are also some faint ones on the nape. The mouth is cleft to opposite the fore part of the eye, and descends obliquely. The teeth are in fine, close, even, brush-like plates on the jaws. An exterior row of more widely set, slightly taller and curved teeth, reaches to the middle of each jaw, and is terminated in the lower jaw by a recurved canine of small size. The gill-opening is vertical, being closed on the under surface of the head. Only four rays sustain its membrane. If there be a fifth one, it is imbedded in the part attached to the isthmus, and cannot be detected without dissection. The last rays of the second dorsal and anal are, as usual, divided to the base.

The basal streaks of the scales cross the exposed disk, and converge to a point in the middle of the posterior edge, which is strongly toothed.

The dark markings are well described in the *Histoire des Poissons*, but the spots on the caudal fin are not noticed. In our specimen there are four rows of round spots, similar to those on the second dorsal; and the interstices appear to have been yellow. The whole ventrals retain the latter tint, and some streaks of it remain on the dorsal and belly. The length of the specimen,  $3\frac{1}{4}$  inches.

HAB. The North-west coast of Australia.

## GOBIUS LENTIGINOSUS. Richardson.

CH. SPEC. *G. gracilis, capite tumido, genis convexis purpureis, punctulatis, corpore marmorato punctatoque; pinnis dorsi caudæque seriatis guttatis, pectoralibus basi punctulatis: dentibus villosis.*

RADI:—D. 6|—1|10; A. 1|9; C. 22; P. 20; V. 1|10—1 united.

Plate I, figs. 5 and 6, natural size.

This small species has some resemblance to the last in the colours of the body, but it is a more slender fish, and the nape is clothed forward to the eyes with scales, nearly as large as those of the body, which are of moderate size. There are no scales on the gill-covers, or rest of the head. The basal grooves are few and parallel, the free edge of the scale toothed. The length of the head is twice its height, and forms one-fourth of the total length of the fish, caudal included. The under jaw is a little more prominent than the upper one. The jaw teeth are disposed in broad, very close, villiform plates, with an outer row of stouter and more widely set teeth, but scarcely taller. There are no distinct canines in the middle of the lower jaw, or elsewhere, and none of the teeth can be clearly seen without the aid of a lens. The gill cover is convex. Three mucigenous lines diverge from the upper lip, a little above the angle of the mouth, one to run immediately beneath the eye, another to cross the middle of the cheek, and a third to traverse the lower part of the cheek. A fourth line runs from the chin along the limb of the lower jaw and the interoperculum, and ascends the vertical limb of the preoperculum. A similar line skirts the temporal groove, and two diverge at a right angle on the gill-cover. Open pores exist on the upper border of the orbit and vertical limb of the preoperculum. The general colours of the specimens in spirits are honey-yellow, marbled and spotted with umber and blackish brown, and minute white specks exist in longitudinal rows along the lower part of the sides. A dark mark is placed on the tail, close to the base of the caudal fin, and there are many dark dots on the snout. The cheeks have a bright purplish hue, with numerous whitish specks. The basal halves of the pectorals are also studded with white specks. There are four rows of dark dots in the first dorsal, and six rows on the second dorsal and caudal. The anal is dark on the border, but unspotted, and there are no marks on the ventrals. Length of the specimen,  $1\frac{1}{2}$  inch.

HAB. Bay of Islands, New Zealand.

## GOBIUS INTERSTINCTUS. Richardson.

CH. SPEC. *G. subcylindricus, rostro gibbo, oculis contiguis; squamis majusculis; lateribus infra ordinibus duobus rectangularum nigrorum supraque lineolis nigris plurimis percursis, cum punctis albescentibus ordinatis interjacentibus; pinnis omnibus præter ventrales albo nigroque alterne lineatis.*

RADI:—D. 6|—1|10; A. 1|8; C. 19; P. 16; V. 1|10—1 united.

Plate V, figs. 3, 4 and 5, natural size; 6 magnified.

This goby has much resemblance in general form to the

preceding one, and, like it, belongs to the division which is characterised by the negative characters of the want of canine teeth, the absence of free simple rays in the pectorals, or of any other remarkable peculiarity in the fins. The snout is very short and gibbous, the eyes rather large, and nearly touching above, and the cheeks are not swollen. The teeth are in villiform bands, tapering off nearly to a single series towards the corners of the mouth, but having considerable breadth at the symphysis, from the addition, as it were, of several rows exterior to the general line of the dental surface. The exterior ones are a very little stouter than the rest, and all are slightly incurved, but there are no canines. The eyes are very prominent, and the short snout is suddenly rounded off. The preorbital lip is rather full, but it is even, and in no wise lobed or notched, as in *Periophthalmus*, which this fish much resembles in the face. The scales of the cranium terminate by a rounded outline, which just touches the orbits. The snout, the whole of the cheeks, gill-plates and membranes are scaleless. Bright yellow muciferous lines branch on the cheek, and traverse the temporal furrow. There are open pores on the disk of the preoperculum, in the temporal furrow, on the nape, and other parts of the head. The lengths of the head and caudal fin are about equal, and each forms one-fifth of the length of the whole fish.

The pectoral is semi-elliptical, or more rounded when very fully extended. Its membrane is very delicate, and readily disappears; but in our most perfect specimens, only the tips of the upper rays are free. The uppermost ray alone is simple. The first and second rays of the first dorsal are longer than the rest. The last ray of the second dorsal and of the anal is divided to the base. The caudal is rounded.

The scales of the body are rather large, and very regularly placed. Each is five sided; having the lateral sides straight and parallel, the base undulated, so as to produce a central rounded lobe, and the two free or posterior sides meeting in an acute angle, with the apex more or less blunt. These free sides are strongly and regularly toothed. About twelve fine fan-like lines run from near the posterior tip to the basal lobe. There are twenty-six scales in a row between the gill-opening and the caudal fin.

The general colour of the specimens in spirits is honey-yellow. The sides are marked by brownish black interrupted lines, which in the upper parts are slender and approximated. The lowest two, being on a level with the lower half of the pectorals, are composed of a series of seven or eight oblong, rectangular spots. The fine upper lines are most numerous at the shoulders of the fish, posteriorly they are reduced to about four; between them there is an equal number of rows of very minute white specks. On the caudal and pectorals there are five or six dark transverse lines, alternating with an equal number of white ones. On the dorsals and the anal there are also alternate black and fine white lines, slightly oblique, and interrupted by the rays. The mucigenous lines on the cheeks are bright yellow, the rest of the head looks purplish, but the colour appears to be nearly faded away in our specimens. The specimen which is figured had the following



## DIMENSIONS.

Length from tip of snout to end of caudal fin .....	3.25 inches.
" " anus .....	1.30 "
" " gill-opening .....	0.70 "
Height of body .....	0.60 "
Thickness of ditto .....	0.45 "
Length of pectoral fin .....	0.55 "
" caudal fin .....	0.70 "

HAB. North-west coast of Australia.

ELEOTRIS GOBIOIDES. Cuv. et Valenc.

*Eleotris gobioides.* Hist. des Poiss. 12, p. 247.

RADI:—B. 6; D. 6 |—1|11; A. 1|10; C. 22; P. 20;  
V. 15.\*

Plate II., figs. 5, 6, natural size.

Many specimens of this fish were procured by the expedition in the salt water of the Bay of Islands, and in a fresh water lake a short way in the interior. They vary considerably in the distinctness of the markings, and the pale vertical line on base of the pectoral fin is in some scarcely to be perceived. The dark blotches on each side of the line always exist.

The operculum and suboperculum are scaly; the anterior corner only of the latter bone, and the interoperculum, being naked. The cheek appears to be naked, but scales may be detected by scraping off the smooth integument. On the top of the head the scales come forward to opposite the posterior third of the orbits, and are scarcely sensibly less than those of the body; their bounding line sweeps round to behind the eye, and there is a cluster of small scales on the temple at the upper end of the preoperculum. Two open pores exist on the disk of this bone, and there are many fine mucigenous lines on the head, viz., one running longitudinally along the interior border of each nasal region, another beneath the eye, a double one along the temporal furrow, one branching on the cheek, one tracing the lower edge of the interoperculum, and continuing up the furrow which marks the edge of the preoperculum to the temple, and, lastly, one crossing the operculum obliquely.

## DIMENSIONS.

Length from upper lip to tip of caudal fin .....	5.80 inches.
" " anus .....	2.90 "
" " gill-opening .....	1.65 "
Length of caudal .....	1.05 "
Height of body .....	1.10 "
Thickness of body .....	0.90 "
" head at gill plates .....	1.00 "

The largest example measures above seven inches in length.

HAB. Bay of Islands, and adjoining fresh-water lakes of New Zealand.

\* The last two rays of the dorsal and anal are separate at the base, and are counted here separately, not as branches of one ray, as in the *Hist. des Poiss.*

ELEOTRIS MOGURNDA. Richardson.

CH. SPEC. *El. rostro, genisque squamosis; fasciis tribus obliquis nigrescentibus in operculis, maculis obscuris in medio latere; pinnis dorsi, ani et caudæ maculosis.*

RADI:—D. 8 |—1|14; A. 1|14; C. 32; P. 16; V. 1|5.

Plate II., figs. 1 and 2, natural size.

This species, like the preceding, has much the aspect of the common obscure-coloured gobies of the European seas, and it differs from the *Eleotrides* generally, in having a greater number of dorsal and anal rays. Its specific name is its native appellation at Port Essington.

The body is highest at the commencement of the first dorsal, and it diminishes so gradually posteriorly, that the tail is only a third less high. In profile the nape is round, and the slope from thence is pretty steep, in a straight or slightly hollow line to the nostrils, where the snout, as is usual in the genus, bulges a little. The thickness of the body is a third less than the height, and the compression increases in the tail until the thickness is only a third of the height. The sides are flattish, the belly is obtuse, the back rather less so. The cheeks and gill-cover are convex, and the top of the head is flat, or somewhat hollow in the middle. The temporal groove is deeply impressed, and is lined with scales, without the fine line of pores which traverses it in many species. Neither are the muciferous lines to be traced on the cheek.

The cheeks and gill-covers are densely scaly, and on the top of the head the scales are equal in size to those of the body. They run forward nearly to the edge of the snout, terminating in an obtuse projection on each side of a small scaleless space, covering the intermaxillary pedicles. The narrow nasal regions, the small preorbitar, the upper and under lips, the lower border of the interoperculum, the lower jaw, and the gill-membrane, are also scaleless. The convex upper border of the orbit is clothed by a triple series of densely tiled scales, much smaller than those on the cheek, or top of the head.

The eye is distant one diameter of the orbit from the tip of the snout, and two-and-a-half from the gill-opening. The head constitutes a third of the length of the fish, excluding the caudal fin. The mouth is moderately large, and the lower jaw is longer than the upper one. The teeth are in moderately broad villiform bands, with an outer row above and below, a little stouter. The tongue and palate are studded by minute glandular-looking papillæ. The gill-membranes join the isthmus far forward, beneath the fore part of the orbit, but the opening is restricted by a delicate interior fold of membrane, beneath the upper limb of the preoperculum. There are three pores on the disk of the preoperculum. The anus is posterior to the middle of the fish, caudal excluded. The anal papilla is small and simple. The general colour of the specimens, after long maceration in spirits, is honey-yellow, or pale brown, unspotted on the under surface of the head and belly, but deepening into dark amber on the back. A crowded series of blackish brown blotches runs along the middle of the sides, and there are three parallel oblique dark streaks on the side of the head. The upper streak

crosses the operculum and base of the pectoral, the other two run from the orbit over the cheek and suboperculum. The vertical fins are spotted. Some specimens measured a third more than the one having the following

#### DIMENSIONS.

Length from upper lip to end of caudal fin .....	4.20 inches.
" " anus.....	2.00 "
" " gill-opening .....	1.15 "
Height of body behind the pectorals .....	0.86 "
Thickness there.....	0.58 "
" at the gill-covers .....	0.63 "
Height of tail .....	0.50 "
Thickness of tail near base of caudal .....	0.16 "
Length of caudal fin .....	0.80 "

HAB. Port Essington, north end of Australia.

#### NOTOTHENIA. Richardson.

CH. GEN. Forma *Eleotridibus* necnon *Trachinis* vel *Percibus* quodammodo similis. Corpus e capite tumido ventreque prominulo in caudam compressum sensim macrescens.

Os modicum, terminale. Labia tumida, reflexa. Intermaxillaria ossa parum protrahilia. Maxilla sub os preorbitale recedens, apice tamen latiori ultro extenso hinc ad angulum oris patefacto.

Squamæ satis magnæ.

Linea lateralis ante finem pinnae dorsi secundæ diffracta, infra resumpta denique ad basin pinnae caudæ desinens. Preoperculum porosum, inerme, acie semicirculari liberâ.

Os operculare prope angulum ejus superum emarginatum, nec tamen in pice recenti angulos acutos ostendens.

Membrana branchiostega radiis sex sustentata, aperturam satis magnam operiens.

Dentes mandibulorum breves, acerosi, inæquales, stipati.

Palatum linguaque levæ.

Pinnae ventrales jugulares: pectorales magnæ, rotundatæ: pinna dorsi prior radiis paucis flexilibus sustentata; dorsi secunda priori approximata, pinnaque ani longæ, æquales.

Cæca pylorica circiter quinque.

Vesica pneumatica nulla.

Cranium convexum, læve.

#### NOTOTHENIA CORIICEPS. Richardson.

CH. SPEC. N. capite coriaceo, papilloso rugosoque; pinna caudæ truncatâ; membrana branchiostegâ albida.

RADI:—Br. 6; D. 5|—34; A. 27; C. 12,  $\frac{1}{2}$ ; P. 17; V. 1|5.

Plate III., fig. 1 and 2, natural size.

Kerguelen's Land, lying in the 49th parallel of south latitude, and 70th degree of east longitude, or directly southward of the Indian Ocean, and far from other islands of any magnitude, is skirted by a belt of sea-weed, among which our navigators obtained many examples of three different species of fish belonging to the genus charac-

terised above as a new form. The present species was taken also at the Auckland Islands, in the 51st parallel, and due south of New Zealand. Other species frequent Cape Horn, and one was procured among the ice, within the Antarctic circle, near the 155th meridian, west. The designation\* of the genus has reference to its high southern habitat, where it is probably represented by one or more species in almost every degree of longitude.

I have not been able satisfactorily to determine the family to which *Notothenia* belongs. In many of its characters it coincides with *Eleginus*, which is associated by Cuvier with the *Scienidae*. They agree in having jugular ventrals, only six gill-rays, and no air-bladder, particulars that seem to indicate a want of affinity with the true *Scienidae*, which are remarkable for the development of their air-bladders, and have cavernous crania, very different from the smooth, rounded skull of a *Notothenia*. The flexibility of the spinous rays of this genus, the open pores on the preoperculum and lower jaw, and the close similarity of its ventrals and general habit to *Eleotris*, induced me to place it among the *Gobiidae*, next to the latter genus; but the existence of the aberrant form of *Notothenia*? *rossii*, which has short, stiff, blunt, though not stout rays, in the first dorsal, renders this collocation less satisfactory.

I have not had access to any specimen of *Eleginus*, for the purpose of instituting a comparison with *Notothenia*, but judging from the figure in the *Histoire des Poissons*, (plate 115.) and that in the *Voyage de la Coquille* of *Eleginus macrorhinus*, the general habit of the two genera is dissimilar. *Eleginus* has a bluff snout, more like a *Sciæna*; its maxillary, considerably enlarged in the middle, glides under a square preorbitar, its head is extensively scaly, and its gill-plate is dissimilar in form. The figure in the *Histoire des Poissons* differs from that in the *Voyage de la Coquille*, in the lateral line being represented as continuous; and though the specimens from which the former drawing was made are stated to have been imperfect, yet the continuous line seems unquestionably to be proper to *Eleginus*, for it is assigned in the *Histoire des Poissons* to two other species, closely resembling *macrorhinus*, and M. Lesson states that his figure is incorrect in this point, and in some others. The interrupted lateral line, therefore, is a ready mark by which to know *Notothenia* from *Eleginus*.

In *Notothenia coriiceps* the head constitutes exactly a fourth part of the length of the fish, caudal fin included, and is convexly conical, with all the corners rounded off, the snout and upper lip forming the rather obtuse apex. The body is thickest at the pectorals, where the height and width are about equal, and is much compressed beyond the anus, which is in the middle of the fish, caudal excluded. Behind the dorsal and anal fins the height of the tail is thrice its thickness. The profile descends in a convex curve from the first dorsal, with a moderate flattening of the cranium, and a sudden drooping of the upper lip, beneath the end of the snout. The belly is rather tumid, and when the blunt tongue is depressed, the integument bulges out between the limbs of the lower jaw. The circular orbit is situated high up, and as near again to the

\* Th. vaterbey.

tip of the snout as to the gill-opening. Its diameter is one-fifth of the length of the head. The upper rim of the orbit is slightly prominent, and the interorbital space, whose breadth exceeds the diameter of the eye by a third, is flat, the flatness reaching from the hind head to near the nostrils. One nasal orifice, with a tubular rim, is situated a short way before the eye. The other opening is very small, and close to the edge of the snout, but it does not differ in appearance from the neighbouring pores.

The head is almost entirely destitute of scales, and its upper surface is rough with innumerable, porous, conical papillae. On the side of the head the roughness is produced by minute crests, or thin, short, cuticular ridges, which occasionally anastomose, or divide. The scales of the body terminate on the nape in a convex curve, which is on a line with the upper ends of the preopercula, and sweeps backwards on each side to the gill-openings. Anterior to this there is a small patch of scales on each limb of the supra-scapular, and four or five small round scales, deeply imbedded in the integument, lie in a line, stretching from the inferior edge of the orbit over the temples. Many small open pores are scattered over the head, particularly on the snout and lips. Five remarkable ones perforate the disk of the preoperculum, and there are three on each limb of the lower jaw. The preorbital has an oblong rectangular form, and is of moderate size, but its form is concealed by the integument which is continuous with the cheek. The rest of the suborbital chain is merely a row of small tubes, closely embracing the under half of the orbit.

The mouth is terminal and rather small, extending backwards only to the anterior third of the eye. The tumid and roughish lips fold back on the intermaxillaries and lower jaw. The teeth on the jaws are short, subulate, and slightly curved, and near the symphyses are disposed in four or five rows, which on the limbs of the jaws are reduced to one. Those forming the exterior row are a little stouter than the rest. There is a narrow but firm velum behind the teeth on both jaws. The roof of the mouth is smooth, and the pharyngeal teeth are a little smaller than those of the jaws. The rather slender maxillary is concealed, for the greater part of its length, when the jaws are closed, by the edge of the preorbital. Its lower, wider, and truncated end, passes beyond the preorbital, curves a little forwards, and is exposed at the angle of the mouth.

The preoperculum has an obtusely elliptical outline, approaching to the segment of a circle, with a perfectly entire edge, which is free, and capable of being elevated. The bony operculum has a semi-circular notch in the upper part of its posterior edge, the bone there being strengthened by two low ribs, whose points form the corners of the notch. Two-thirds of a disk of the bone is below the notch. The suboperculum is much less high. These parts are concealed in the recent fish, but show a little as the integument dries. The thin interoperculum is rather broad. The gill-rays are stoutish, and somewhat curved, and the gill-membrane is a little narrowed at the edge, which causes it to swell out when fully extended, the play of the pieces of the gill-cover producing a corresponding bulging out of the sides of the head. The membranes are united on the throat, and a free edge is left

where they adhere to the isthmus.\* On the rays the entire is rough, but it is smooth in the folds of the membrane. The bones of the humeral chain are smooth.

The scales are moderately large, there being fifty-four in a row between the gill-opening and base of the caudal, exclusive of two or three small ones on the latter fin, and eighteen in a vertical row anteriorly, of which six are above the lateral line. Each scale is truncated at the base, has two parallel sides, and a rounded free edge, its length and breadth being about equal. Ten or twelve diverging furrows cross the centre of the disk, and end on the basal edge, where they produce a corresponding number of crenatures. The semicircular tip is covered with thick epidermis, which under the lens appears to be dotted with stelliform specks. When the integument is removed, little pits appear on the scale, but there are no rough points, or the slightest indication of teeth. This is the character of the scales generally on the back, belly and tail, but on the sides behind the pectoral scales are more truncated at the tip, without the membranous edge, and are distinctly toothed on the edge. The difference of the two kinds of scales is not readily perceptible to the naked eye. The lateral line runs near the back, and terminates under the thirtieth ray of the second dorsal, recommencing two scales lower down, and running along mid-height of the tail to end at the base of the caudal. Except two or three crowded rows of small scales on the base of the caudal, and the patch which encroaches on the base of the pectoral anteriorly, there are no scales on the fins. The pectoral is naked posteriorly.

The ventrals, having much resemblance to those of an *Eleotris*, are situated before the bases of the pectorals. Their small spine has a flexible tip. The pectorals are rather large, and are rounded. They reach beyond the anus. The first dorsal commences over the base of the pectorals, and is sustained by five flexible rays. The second dorsal begins close to the end of the first one, and has an even outline. All its rays are jointed, but the first is unbranched, though its tip is divided by a dark line. The last ray is divided to the base. The anal, similar in form to the second dorsal, has no spinous ray. The caudal is even at the end, with the corners rounded off.

The colours of the fish appear to have been obscure, but they cannot be made out from the specimens. The gill-membrane and under surface of the head are white. There are some dark marks on the gill-cover, and the whole upper surface is darkish.

The intestines of the specimen examined were somewhat damaged, but the stomach was distinctly made out to be wide, with a short conical pyloric branch going off laterally at about the third of the height, from the rounded fundus. The internal surface, especially towards the pylorus, is finely reticulated, and coarsely plaited. The pylorus is much contracted, and five obtuse caeca surround the gut immediately below it, the longest exceeding an inch in length. The gut was filled with *Entomostraca*, and a few small shells.

\* In the *Eleotris* the gill-membrane is attached to each side of the narrow isthmus, is not united to its fellow, exterior to it, and consequently has no free edge at the union.

## DIMENSIONS.

Length from the intermaxillary symphysis to extremity of caudal .....	10.20 inches.
Length of head to gill-opening .....	2.55 "
" caudal fin .....	1.41 "
Height of the head at the occiput .....	1.75 "
" body at the first dorsal .....	2.14 "
Width of the head at the preopercula .....	2.10 "
" of shoulder at the first dorsal .....	2.14 "
Distance between the eyes .....	0.65 "
Diameter of the orbit .....	0.50 "

HAB. The coasts of Kerguelen's land, and of the Auckland Islands.

## NOTOTHENIA CYANOBANCHIA. Richardson.

CH. SPEC. *N. capite* (præter genas, partes supra-scapulares et superiores operculi squamosas), cute levisimâ tecto; pinnâ caudæ rotundatâ; pinnis dorsi membranâ connexis; membranâ branchiostegâ margine cæruleo.

RADI:—Br. 6; D. 4|—36; A. 32; C. 22; P. 21; V. 1|5.

Plate IV., figs. 1, 2, natural size.

This species has a rather smaller and more depressed head than the preceding one, the total length of the fish being equal to  $4\frac{1}{2}$  times that of the head. The width of the head is equal to its length, its height is less. The top of the head, the preorbital, suborbitals, and lower parts of the gill-plates, are covered with perfectly smooth integument, without a vestige of the papillæ which are crowded over the head of *coriiceps*. There are, however, two small scaly patches on the limbs of the supra scapular on each side, and nearly the whole cheek and the upper quarter of the operculum are scaly. Pores exist on the preoperculum and lower jaw as in the preceding species, and there are also some on the snout, and on the upper margins of the orbits. The teeth do not form more than two irregular rows at the symphysis of the jaws, and are smaller on the pharyngeal bones than those of *coriiceps*. The two dorsals are also joined at the base by membrane; the numbers of the rays differ. In other parts of structure the resemblance is close. The lateral line is interrupted under the thirtieth ray of the second dorsal, and in recommencing again below, it is faintly shown farther forward. A band of deep purple, or blue, skirts the edge of the gill-membrane. In this species most of the scales of the body are toothed on the posterior edge, those having a smooth membranous margin being confined to the summit of the back and ventral surface. A scale taken from the side is nearly equally four-sided, the posterior edge being convexly curved in a slight degree, and finely toothed. The bases of teeth which have worn off, produce rounded eminences on a narrow part of the disk, adjoining the edge. Fifteen furrows commence close to this rough border, cross the disk, and end on the base, including its rounded corners, producing a corresponding number of crenatures. There are six rows of small scales on the base of the pectoral, anteriorly. The corresponding part behind is naked. The last rays of the second dorsal and anal are divided to the base.

The intestines were damaged, so that their form could not be fully ascertained, but four pyloric cæca were clearly

made out, and there may, perhaps, be a fifth. No vestige of an air-bladder was seen.

## DIMENSIONS.

Length from intermaxillary symphysis to end of caudal fin .....	10.50 inches.
Length from intermaxillary symphysis to gill-opening .....	2.55 "
" of caudal fin .....	1.40 "
Thickness at preopercula .....	2.22 "
Height at occiput .....	1.85 "
" 1st dorsal .....	2.15 "
Diameter of orbit .....	0.50 "
Breadth between orbits .....	0.50 "

HAB. The coasts of Kerguelen's Land.

## NOTOTHENIA PURPURICEPS. Richardson.

CH. SPEC. *N. pinnis dorsalibus discretis, pinnâ priori superne nigra; genis hemilepidotis; capite purpureo.*

RADI:—B. 6; D. 4|—35; A. 31; C.  $11\frac{1}{2}$ ; P. 21; V. 1|5.

Plate II., figs. 3 and 4, natural size.

This species considerably resembles the last one, but it is less compressed posteriorly; its whole head has a purple hue, and the edge of the gill-membrane has the dark bluish tint of *cyanobranchia*; the first dorsal is not united by membrane to the second, and the upper half only of the cheek is scaly. There are also some minute differences in the form of the scales near the temples. There are fifty-two rows of scales between the gill-opening and caudal fin. The tail is less compressed than in the other two species. The vent is close to the first ray of the anal fin, with its orifice facing it, and there is no anal papilla. Our examples of the other species had been slit open on the belly, so that the non-existence of an anal papilla could not be clearly ascertained. In the enumeration of the rays given above, the last two of the dorsal and anal are considered as separate rays, instead of branches of one ray, as in the preceding species. The teeth are similar to those of *cyanobranchia*.

The following anatomical particulars were ascertained. The intestines similar to those of *coriiceps*, the pyloric cæca five in number. In the skeleton the top of the skull is smooth and rounded, both transversely and longitudinally, without ridges. The thin papery preorbital has an oblong rectangular form; the other bones of the suborbital chain are mere narrow tubes which bound the inferior half of the orbit. The preoperculum is traversed by canals in its substance, which open on the disk by oblique, irregular mouths. Its outer edge is thin and entire, and the integument which covers it is perforated by pores, as in the other species. The operculum has a quadrantal form, with a notch occupying the upper quarter of its posterior curved edge. The acute points which bound the notch, are the tips of two depressed slender ridges, or smooth ribs, which strengthen the bone, and meet anteriorly at its articular angle. The suboperculum is narrow, and tapers into a thin submembranous tip. The interoperculum is rather wide, oblong, and thin, with an even edge. A thin posterior ridge gives strength to the limb of the intermaxillary. There are forty-six vertebrae, fifteen of which are abdominal.



## DIMENSIONS.

Length from upper lip to end of caudal fin .....	5.20 inches.
gill-opening .....	1.31 "
Length of caudal-fin .....	0.70 "
Width of head .....	0.90 "
Height of hind head .....	0.80 "
first dorsal .....	0.95 "
Thickness of body at the pectorals .....	0.85 "

HAB. The coasts of Kerguelen's Land.

## NOTOTHENIA CORNUCOLA. Richardson.

CH. SPEC. *N. capite nudo, lavi, poroso; squamis nullis supra-scapularibus, operculis superne squamosis.*

RADI:—Br. 6; D. 5—32; A. 27; C. 19; P. 21, V. 1½.

Plate VIII., figs. 4, 5, natural size.

Many specimens of a small *Notothenia* were collected by the expedition, among the sea-weed that lines the shores of Cape Horn. These specimens have suffered much injury from deterioration of the spirit in which they were put, and the figure is the result of a combination of the most perfect, one supplying what was wanting in another. It is drawn to the dimensions of the largest specimen.

In general form the species resembles *N. cyanobrancha*. The dorsal fins are distinct, but contiguous. There is a band of deeply imbedded scales on the upper border of the operculum, a few small ones on the temples adjoining the upper end of the preoperculum, but none on the space enclosed by the limbs of the supra-scapular. The tip of that bone is crenated, and looks like a scale through the investing skin. A row of pores completely encircles the eye, and runs forward along the edge of the snout. Pores also trace out the limb of the preoperculum, and run along the lower jaw, and there is a single pore on the mesial line, between the eyes. The interorbital space is narrower than the width of the orbit. The posterior nostril is shortly tubular; the anterior one cannot be distinguished from a pore. The scales on the belly are very small, and between the ventrals they are confined to the middle third of the space. On these parts they are not toothed, and no teeth are visible on the larger scales above and behind the vent. On the sides of the body and tail the scales are strongly ciliated. There is no anal tubercle.

The colours generally have faded. The cheeks and bases of the pectorals are dark, the caudal, second dorsal, and pectoral fins are finely mottled. The stomach is pyriform, with a short, nearly cylindrical pyloric branch springing upwards from above its middle. Round the pylorus there are seven short cæca, and the intestine, in its course to the anus, doubles once. The stomachs of those which we opened contained small fish, crabs, and crayfish.

Length, from three to six inches.

HAB. Cape Horn, Port Louis.

## NOTOTHENIA PHOCÆ. Richardson.

CH. SPEC. *N. rostro convexo, rictu oris ascendenti; corpore fusiformi, caudâ compressâ; pinnâ dorsi secundâ pinnæque aui arcuatis.*

RADI:—Br. 6; D. 4—25; A. 30; C.     ; P. 23; V. 1½.

On the 14th of January, 1842, when the ships were

embayed among ice, in the 65th parallel of south latitude, and about the 155th west meridian, a seal was taken with twenty-eight pounds of fish in its stomach. The fish were of two kinds, one a *Sphyræna*, the other a *Notothenia*, of which there were many mutilated individuals. Dr. Hooker made a careful drawing of the most perfect, and put several examples in spirits, but they have become still more deteriorated, though enough remains to leave little doubt as to the genus, and even to show that the species is distinct from any of the preceding ones, but not sufficient to furnish materials for a correct description.

In the form of the head this fish closely resembles the following, *N. magellanica*, the orifice of the mouth in both being more oblique than in the four species we have figured. The dorsal line also is more arched, and there is a corresponding curve of the ventral line posterior to the anus. Anterior to that orifice, the belly, as in the others, is rather protuberant, and, on that account, the body is highest at the commencement of the second dorsal fin, though the summit of the dorsal curve is so far back as the ninth ray of the fin. This ray is, moreover, the tallest, and the anterior and posterior ones diminish very gradually in height, so as to give a flatly curved outline to the fin. The first dorsal appears to be as high as any part of the second one, but neither Dr. Hooker's sketch, nor the specimens, enable us to determine whether the two fins were connected by membrane or not. The second ray of the first dorsal is the tallest, the form of the fin being the same with that of *magellanica*. The anal closely resembles the second dorsal, and both fins have a slightly prolonged tip to the last ray. The pectoral is similar in form and relative size to that of the figured species, and the ventrals are also similarly placed. The caudal was mutilated in all the specimens. Neither the course of the lateral line, nor the presence or absence of scales on the head, could be ascertained. The scales of the body appear to have been tolerably large. Dr. Hooker's notes state that they were deeply imbedded in the skin. The jaw teeth are in narrow bands, and near the middle of each limb of the lower jaw there is one a little larger than the rest, which may be called a small canine tooth. The partially digested fragments were coloured "azure-blue, mixed with pale pink, the blue stronger, brighter, and more silvered about the gill-covers, jaws, and cheeks, mottled more or less with large black spots, especially about the upper aspect of the head, the belly, base of the pectorals, and shoulders. The black pupil surrounded by a brilliantly iridescent iris, streaked with azure-blue, silver, and carmine." Perhaps some of the tints mentioned by Dr. Hooker may have been produced by the action of the gastric juice.

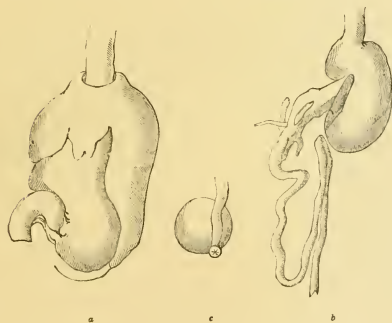
The liver is pale red, very large, three lobed, and covers the ventral surface of all the intestines. Its breadth above, in a fish 6¼ inches long, is 1.08 inch. Below, when spread out, it measures 2.40 inches. The left lobe, *in situ*, is 0.70 in length, the right one hangs down to the anus, and is 1.78 inch long; the intermediate lobe is much smaller. The vertically kidney-shaped stomach emits from its middle at right angles a short cylindrical pyloric branch, 0.42 inch long, and below the pylorus there are five cylindrical obtuse cæca, the longest of which measures 0.35 inch.

The surface of the stomach was studded with large chalky-looking spots. Intestines white, corrugated, and three inches in length. An oblong red spleen lies between the pyloric branch and body of the stomach. The urinary bladder close to the anus, spherical, and in all the specimens, full of water. There were but few females among the specimens, and in these the ova were very large and white." The subjoined vignette represents the liver and stomach, *in situ* (a); the stomach and intestine (b), and the urinary bladder and lower part of the rectum (c).

DIMENSIONS of five of the most complete specimens.

	Females.				Male.			
Length, exclusive of caudal...	0.73	0.35	0.27	0.00	2.53	inches.		
" from vent to caudal...	5.72	3.42	3.07	3.60	1.28	"		
Greatest depth of body.....	1.82	1.63	1.20	1.50	0.48	"		
" breadth of ditto.....	1.12	0.98	0.93	1.03	0.26	"		
Length of head to gill-opening	2.00	1.82	1.82	1.83	0.59	"		
Height of head.....	1.21	1.17	1.28	1.15	0.45	"		
Breadth of ditto.....	0.85	0.80	0.91	1.02	0.25	"		
Length of pectoral fin.....	1.60	1.25	1.26	1.28	0.27	"		
" ventrals.....	1.11	1.07	1.04	—	—	"		
Average weight, 2½ ounces.								

HAB. Antarctic Glacial Ocean, off Victoria Land.



NOTOTHENIA MAGELLANICA. Forster.

CH. SPEC. *N. capite supra plano, declive, lateribus et infra rotundato, squamoso; preoperculis, operculisque squamosis; pinnis ventralibus acuminatis, pinna dorsi secundæ et anti sensim postice diminuendis; pinna dorsi prioris trigonæ; pinnis omnibus fuscis.* (Forster.)

RADI:—Br. 6; D. 5½—31; C. 14; P. 17; V. 1½. (Forster.)

*Gadus magellanicus*, I. R. Forsteri, M.S. IV. 46. apud Bl. Schn. p. 11. Icon. med. Bibl. Banks. fig. 178.

Of this species we have seen no example. The figure above referred to represents a fish very similar to the following in general form, but with a different outline to the

ventral fins, and a first dorsal similar to that of *cyano-branchia*.

HAB. Among the sublittoral sea-weed of Terra del Fuego.

NOTOTHENIA ? ROSSII. Richardson.

CH. SPEC. *N. ? radiis pinne dorsi prioris rigidis, obtusis, brevibus; corpore elongato.*

RADI:—Br. 6; D. 7½—1½2; A. 1½26; C. 1½4; P. 22; V. 1½5.

Plate V., figs. 1, 2, one-fourth of the natural size.

This fish is not only of a much larger size than the specimens of the preceding species of *Notothenia* which were brought home, but differs from them all in its comparatively low first dorsal, supported by bluntish spines, destitute of flexibility, or of filamentous tips. There is, moreover, a very short spine at the commencement of the dorsal and anal, and the pectoral fin is smaller, and less orbicular than in the other *Notothenie*. In other respects there appears to be no external generic difference. Only one specimen exists in the collection, and that is merely the stuffed skin, so that we can add no anatomical particulars to the following description, which, from the aberrant character of the species, is given in detail.

The head measures more than a fourth part of the whole length of the fish, caudal fin excluded. Its height at the preoperculum is about one-seventh less than its thickness, which is equal to two-thirds of its length. The top of the head is flattish, the descent from the hind head to the snout is very slight, and the inclination is equally slight along the back to the tail. The belly is a little tumid, but its profile behind the anus has the same inclination with that of the back, in an opposite way. The head is thicker than the body. The oval and lateral orbit is rather large, and is placed high up in the cheek, at the distance of more than its length from the edge of the upper lip, and three and a half times as far from the gill-opening. In the dried specimen the suborbital bones show unevenly through the skin, but when the fish was recent, they must have been entirely concealed. The anterior one covers merely the head of the intermaxillary, its edge not being free beneath. One nostril is placed on a level with the upper edge of the orbit, and midway between the eye and anterior corner of the preorbital, or edge of the snout. This has a tubular rim. The other very minute opening is close to that corner. The preoperculum has its limbs slightly curved, and meeting at a right angle, but with the corner gradually rounded off. Its edge is quite smooth, and its very narrow disk is perforated with pores, as in the other species, but their number cannot be ascertained from the specimens, as both cheeks have been opened along the edge of the preoperculum, in its preparation. The upper end of this bone is about midway between the eye and the gill-opening. The slightly uneven interoperculum is five times as long as it is broad. The suboperculum is anteriorly of the same height with the interoperculum, and gradually tapers away posteriorly to a thin point, which





## DIMENSIONS.

Length from end of snout to tip of caudal.....	5.45 inches.
" " of head to edge of operculum.....	1.50 "
" " gill-opening.....	1.20 "
" " first dorsal.....	1.25 "
Long diameter of orbit.....	0.40 "
Breadth of head at gill-cover.....	0.90 "
Height of body at nape.....	0.55 "
Height at middle of second dorsal.....	0.55 "
Breadth of body there.....	0.75 "

## Genus HARPAGIFER. Richardson.

CH. GEN. Caput horizontale, supra planum, triangulare.

Corpus in caudam maxime compressam sensim e humero attenuatum.

Squamæ nullæ. Linea lateralis antice trans nucham cum pari suo conjuncta ramulunque ad orbitam utramque emittens in summo dorso cursum tenens et ad medium basis pinnae dorsi secundæ desinens.

Os parvum terminale. Dentæ mandibularum minuti, subulati, subincurvi, stipati. Palatum linguaque laxes.

Oculi modici, laterales. Ossa suborbitalia. Preoperculum inærne, ellipticum. Interoperculum gracile, spatuliforme, preoperculum occultum. Operculum spinam hamiferam sursum extrudens. Suboperculum spinam rectam aequè insignem emittens.

Apertura branchiarum satis magna nec tamen sub gula extensa. Membrana branchiostega radiis sex sustentata.

Pinnae dorsales duæ, quarum prior radiis paucis flexilibus sustentata. Pinnae ventrales Eleotridum.

Vesica pneumatica nulla. Cæca pylorica tria.

OBS. Genus inter *Callionymum* et *Platypterus* collocandum.

## HARPAGIFER BISPINIS. Richardson.

*Species unica adhuc cognita.*

RADII:—B. 6; D. 3|—24; A. 17; C. 11½; P. ; V. 1½.

*Batrachus bispinis.* Bl. Schn. 45.

*Callionymus bispinis.* 1. R. Forster. M.S. IV. 45.

Plate VII., figs. 1, 2, 3, natural size.

This small fish abounds among the kelp, on the shores of Cape Horn. Many specimens were taken, but they are all injured by deterioration of the spirit into which they were put, so that the true distribution of the dark bars or spots cannot be determined, and some uncertainty exists with respect to the exact shape of the first dorsal, though there is none as to the number of the rays. It seems to be, unquestionably, the fish described by Forster, in the notes quoted above. The description, the size of the specimens, and the locality, correspond. Forster notes the colour of his specimens as being blackish-brown above, with an intermixture of orange-red on the head; the second dorsal, pectorals and caudal, as being varied with orange-red and brown, and the under surface of the body as pale orange, the anal having a deeper tint of the same. He enumerates also a ray less in the second dorsal, and

one more in the anal, than the individual we have described below possesses, but a similar variation exists in Sir James Ross's specimens. The course of the lateral line corresponds with Forster's account of it; but the line of pores on the middle of the sides could be traced only at the base of the caudal fin, owing, most probably, to the skin being softened and worn.

The height and breadth of the fish is greatest at the gills, the head being a short pyramid, and the body a greatly elongated one, with the plane connecting the tips of the opercular and subopercular spines for a common base. The top of the head behind the eyes is flat, and slightly concave, without ridges. The eyes are placed high up, and the snout anterior to them is short and triangular. The length of the head is contained 3½ times in the whole length of the fish, and its breadth at the hind head, when the gill-covers are open, is equal to its length. Before the eyes the profile descends obliquely to the tip of the snout. The under surface of the head and breast is flat, and the ventral line ascends slightly from the ventrals to the tail, in correspondence with the inclination of the back. The height of the tail, at the base of the caudal fin, is equal to a third of the height of the nape. The eye is 1 diameter of the orbit from the tip of the snout, and 1½ from the gill-opening, 3½ diameters being equal to the length of the head.

The mouth is small, horizontal, and terminal, the lower jaw being just perceptibly longer than the upper one. The jaws are very little protractile. The very short teeth are subulate, slightly curved, and crowded into a small tuft at the symphyses above and below, but reduced almost to a single row on the limbs of the jaws. There is a narrow velum behind them on both jaws. The tongue and roof of the mouth are smooth. The maxillary increases gradually in breadth to its lower end, which is truncated, and moves over the limb of the lower jaw. A very short part only of its slender upper end glides under the edge of the preorbitar.

Preorbitar narrow, not toothed, but having a cavernous or cellular structure, which is concealed by the integument. The rest of the suborbitar chain is reduced to a row of little eminences, with porous mouths, closely skirting the eye beneath and behind, and leaving a large, fleshy, convex cheek. The preoperculum has an obtuse semi-elliptical curve, with a rather narrow disk, equally wide throughout, and without any projection at the curve. In drying, the integument permits cavities on the disk to appear. The interoperculum is slender and cylindrical, and is concealed under the edge of the preoperculum. The end which joins the suboperculum is dilated, so as to give the form of a spatula to the entire bone. The operculum ends in a strong spine, which stands upwards, and a little outwards, and gives off from its inner side, near its tip, a hooked antler-like branchlet. The suboperculum ends in a straight horizontal spine, having a slight notch at its tip. When the gill-plates are raised, the spines project laterally, and a narrow border of membrane runs between them, to the extreme edge of which the branchiostegous membrane is united at an acute angle, and several of the rays show between the opercular and subopercular spines. The suboperculum also sends off vertically a filiform, flexible,

## CHÆNICTHYS. Richardson.

*Chænictchys*, Richardson. Ann. Nat. Hist., June, 1844.

cartilaginous ray, which lies in the branchiostegous membrane, above the uppermost ray, and parallel to it, and might be easily mistaken for a seventh ray. There is a deep notch on the upper edge of the operculum, above the spine, which is filled by membrane. The gill-opening is pretty large, but mostly vertical. The branchiostegous rays are cylindrical and slender, and the membrane, when extended, bulges, from the greater narrowness of its edge.

There are no scales; the skin being smooth, and apparently destitute of skinny processes. The lateral line commences at the orbit, unites with its fellow by a transverse line on the nape, then runs to the upper angle of the gill-opening, and from thence crosses the shoulder to the base of the second dorsal, at the middle of which it terminates. At first it is traced by a series of contiguous tubes, with open mouths, but before it terminates by three or four pores only, without the tubes. Two or three pits may be seen, with difficulty, at the base of the caudal, on the level of its middle rays, as if the line had recommenced there.

The pectoral and caudal fins are rounded in outline. The first dorsal is somewhat triangular, and is supported by three flexible, filiform, jointless rays. All the rays of the second dorsal (twenty-four) are jointed, and the last one is divided to the base. The anal contains seventeen rays, the last being divided, and all of them jointed. The ventrals, in position and form, resemble those of an *Eleotris*. They are a little in advance of the pectorals. The spine is short, and has a flexible tip.

The original colours have perished, but the specimens still show oblique dark bands on the body and second dorsal, and three or four narrow transverse bands on the pectorals and caudal.

The skeleton shows a very short occipital spine, which does not rise above the hind head, and is not visible in the recent fish. The vertebrae are thirty-five, of which eleven are abdominal and twenty-four caudal. The peritoneum is silvery, with minute dark brown specks. The liver, broad, thin, and rounded, lies on the ventral surface of the upper part of the stomach, embracing the oesophagus, and having a fissure on the left side, to half its depth, separating a small obtuse tongue-shaped lobe. Stomach nearly globular, with a very short pyloric branch on the right side. The intestine makes a short convolution on the right side of the stomach, not descending to the fundus of that viscus, and then runs straight to the anus. Three short conical caeca surround the pylorus. There is no air-bladder. The stomach filled more than half the belly, and contained *Crustacea*. A parasitic worm was half buried in the liver.

## DIMENSIONS.

Length from tip of snout to end of caudal fin .....	2.35 inches.
" " upper angle of gill-opening .....	0.65 "
" " point of opercular spine .....	0.75 "
Breadth between tips of opercular spines .....	0.78 "
" " subopercular ditto .....	0.85 "
Height of nape .....	0.40 "
Length of caudal .....	0.40 "
Diameter of eye .....	0.18 "

Caput magnum, cranio scabro, subtrigono, facie horizontali ante oculos longa, lateraliterque per parietes oris membranaceos dilatabilia aucta.

Faux laxissima, horizontalis, terminalis; rictu superne ab ossibus intermaxillaribus (satis mobilibus nec tamen propter pedicellorum eximium brevitate protractilibus) facto. Os maxillare gracile, paulo in f. curvatum, angulum tantum oris attingens, nec sub aciem ossis preorbitalis recedens.

Dentes in ambitu oris breves, curvati, stipati. Vomer et palatum edentati. Ossa pharyngis denticulata.

Oculi largiusculi, laterales.

Narium aperturæ anteriores ante articulos ossium maxillarium posita a posterioribus remotæ.

Os preorbitale oblique flabelliforme, rostro brevius: ossa suborbitalia sequentia minima, scabriscula, orbitam subter cingentia.

Gena magna, nuda, inermis, nec modo Triglorum osse suborbitali secundo percursa.

Ossa operculi parva, una cum membranâ connectent circumneutique operculum modicum triangulare conficientia. Os operculæ proprium, tripartitum: pars postica ad marginem sublibera et in apicibus quinque subspinosis divisa.

Apertura branchialis amplissima intra ramos maxillæ inferioris procedens. Membrana branchiostega lata, radiis sex gracilibus teretibus sustentata. Arcus branchiarum quatuor, liberi, et lamina una operculo adnata.

Corpus teres, modo Triglorum in caudam gracilem sensim attenuatum, ventre tumidiusculo.

Squamæ raræ nullæ. Cutis lævis. Linea lateralis post finem pinne dorsi secundæ diffracta dennoque ad basin pinne caudæ desinens, per totum cursum suum scutellis scabris armata. Scutelli rotundi pauci in medio latere sparsi.

Pinnae ventrales ante pectorales posita. Pinnae ventrales pinnas Triglae similes. Dorsales duæ, quarum prior alta, triangularis; secunda longa, radiis setaceis, simpliciusculis, articulatis sustentata. Rudii pinne ant omnes articulati cum apicibus modo Trachinorum de membrana extantibus. Pinnae pectorales majusculæ, rotundatæ, non pedicellatæ, radiis omnibus divise.

Papilla genitalis simplex, parva.

Vesica aeris nulla.

Ventriculus ovalis, ramo brevi ascendenti; caeca pylorica duæ brevia.

Obs. Genus inter *Hæmerocetem* et *Conephorum* locandum. Nomen ab *χῆνω* hisco, et *ἰχθῦς* piscis derivatum.\*

\* In constructing a generic name from these Greek words, I followed, at first, the example of Ovid (*De Piscibus*), who wrote *Channe* as the Latin derivative from *χῆνω*, but it has been suggested to me, that the conjunction of this adopted Latin word with a Greek one, is not so proper as following the Greek orthography in both; and I have, therefore, altered *Chænictchys* to *Chænictchys*. I was precluded from using the word *Channe* alone, from its having been the designation of a Mediterranean fish.

## CHENICHTHYS RHINOCERATUS. Richardson.

*Species unica adhuc cognita.*

RADI:—B. 6; D. 7|—34 vel 35; A. 33; C. 11½; P. 22;  
V. 1½.

Plate VI., figs. 1, 2, and 3.

This fish has a general resemblance to the Gurnards, or Prionotes, in the form of the head, the tapering body, and the fins, but is without the free pectoral rays. The head makes one-third of the length of the fish, exclusive of the caudal fin, and from its width, its bulk is in still greater proportion. Its great size is chiefly owing to the extent of the face and mouth. It is wider than the body, and the flat top of the somewhat cubical cranium is continuous with the straight line of the back: before the eyes the profile is slightly concave. The snout is formed of the frontal bone, lengthened into two low, transversely rounded ridges, separated by a narrow mesial furrow, and is enlarged laterally to the full width of the head, by the soft, extensible walls of the ample mouth. Almost all the bony parts of the head have a more or less granular or radiated surface, as in the Gurnards, but the bony case is less complete than in that genus, much smooth integument interposing between the plates of bone. The vomer appears on the upper surface of the tip of the snout, between the ends of the frontal processes, in form of a small circular plate, with a central umbo, or horn. This plate is flanked on each side by the narrow ends of the nasal bones, and the points of the palate bones, which likewise show through the integument, marking the breadth of the truncated end of the snout. The articulating knob of the maxillary is contiguous to the tip of the nasal bone on each side. The truncation of the proper snout is not, at first sight, evident, for the intermaxillaries, lying at their symphysis in the same place with the frontal processes, constitute the anterior extremity of the head, which is thin vertically, but widely curved laterally. Their pedicles being very short, admit of no protrusion, but being connected by soft parts to the proper extremity of the snout, have a vertical hinge-like motion. The limbs of the lower jaw meet at the symphysis in a rather acute ellipse, and have a small knob beneath. The under jaw is fully equal to the upper one in length. Its articulation being under the centre of the eye, admits of a very wide gape, but the horizontal orifice of the mouth is restricted to about two-thirds of the length of the jaw, by membranes, which include the maxillaries, and fold up as the mouth closes. The surface of the articulating piece of the lower jaw is furrowed, and roughly granular.

Both jaws are armed with flat bands of fine card-like teeth, the bands narrowing to a point at the corners of the mouth. There is a narrow velum immediately behind the dental surface, above and below. The roof of the mouth is toothless.

The maxillaries have a slender, cylindrical shape, slightly curved, like the italic *f*, and becoming thinner, and a very little wider, towards the end which touches the corner of the mouth, and plays along the limb of the lower jaw. They are granulated at the upper end, and striated and

smooth lower down. Their articulations are entirely posterior to the intermaxillary pedicles, so that the two bones approach only at the corner of the mouth. The very small anterior nasal opening is situated close before the articulating head of the maxillary; the posterior one is over the middle of the preorbitar, and has a short tubular margin. The eyes are rather large, the long diameter of the orbit being equal to about one-sixth of the length of the head. They are two diameters nearer to the tip of the gill-cover than to the intermaxillary symphysis. The upper edge of the orbits is raised so as to render the inter-orbital space concave. The top of the skull is flat, and nearly square, and, together with the orbital plates, is strongly marked by radiating granular lines. The principal centre of radiation on each side is near the base of the orbital plate, lines running from it to the edge of the orbit, to the occiput, and across the posterior part of the frontal bone. There are three much smaller radiating clusters on the hinder part of the cranium, behind which four small rough plates cross the head, and form the posterior boundary of the skull, while the rough temporal bones flank it laterally. A short occipital crest, and two roughly striated supra-scapulars, which pass outwards to the humeral chain, are on the same plane with the top of the skull and the nape.

The preorbitar bone has a scalene triangular form, the under side being the hypotenuse. It is traversed by fine, prominent, smooth, radiating lines, whose tips form teeth on the edge of the bone. The preorbitar reaches about half way to the intermaxillary symphysis, but there is much smooth integument beneath it, and the maxillary scarcely touches it, even when the mouth is closed. The other bones of the suborbitar chain are small and rough, and girdle the under half of the orbit, leaving a large naked cheek. The second suborbitar bone has no resemblance, in form or office, to that of the Gurnards. The preoperculum is considerably curved, and has an obtuse process, or elbow, a little above the apex of the curve. Its disk, including this elbow, is roughly granular. Its upper limb is nearly vertical, and is shorter than the under one. It is a little distant both from the temporal bone and the operculum. The sub-cylindrical interoperculum is widest at its junction with the suboperculum, and is rough and ridged on its surface. The bony operculum is divided deeply into three diverging parts, exclusive of its very short articulating stem. The upper and under parts are triangular, and the posterior one is split into five teeth, having the spaces between them filled with a notched membrane. The posterior and uppermost tooth varies in form, being sometimes forked, at other times crenated, or denticulated. The others point more or less downwards, and the lowest and foremost is a little recurved. They all rise at their tips, with their membrane, from the general surface of the gill-cover. The bony part of the suboperculum shows, exteriorly, in form of fine ribs, imbedded in the general membrane of the gill-cover, and radiating towards its edge, beyond which they slightly project. This structure approaches to that of the suboperculum of a *Lophius*. The entire gill-cover has a triangular form, with an acute tip, which is somewhat curved upwards. It is united to the side of the head, at the junction of the









colour of the body is greyish, with a purplish brown shining through, and a minute reticulation of lighter lines. A brown band crosses the middle of the caudal, interrupted by a mesh-work of clear, transparent spaces. The whole skin is thickly studded with little globular eminences, from each of which, two divergent, minute, hair-like spines stand out. These spines are equally conspicuous on all the fin membranes.

The first dorsal ray is very slender, rises from a globular base, and terminates in a single lanceolate membranous tip. The third ray is closely bound down by the skin. The profile is more arched than that of *hispidus*, and most of the species nearly allied to it. The thickness of the shoulder is but little more than a fourth of its height.

#### DIMENSIONS.

Length from upper lip to tip of caudal fin.....	1.55 inches.
Height at the ventrals .....	0.70 "
Greatest thickness.....	0.18 "
Length of the caudal fin.....	0.40 "

#### CHEIRONECTES POLITUS. Richardson.

*Cheironectes politus.* Richardson, Zool. Trans., vol. iii., part 2, p. 133.

Plate IX., fig. 2, natural size.

This species belongs to the little group of *Cheironectes* which have the second and third dorsal rays united by membrane, to form an anterior fin, and more elongated bodies than the other members of the genus. Two examples of the same group are made known in the *Histoire des Poissons*; one having a rough skin, the other so much more smooth that it has received the name of *levis*, yet it is said to be furnished with scabrous points, similar to those of *hirsutus* in structure, though a little less rude to the touch. The subject of the present notice is perfectly smooth and soft, and a powerful eye-glass reveals no inequalities in the skin. It is without skinny appendages, at least in the state in which we have received it. The gill-opening, with a tubular lip, is situated behind, and a little above the level of the pectoral arm. The work above referred to contains a description of the fish, but it requires the following slight corrections in the account of the fins, as I have ascertained by minute examination and dissection.

RAIES:—D. 1|—2|—17; A. 9; C. 9; P. 9; V. 1|4.

The two anterior rays of the second dorsal are graduated, and enclosed in the membrane, so as to look like one ray, until dissected. They are a little shorter than the third, which is the tallest of all. The fin lowers in the middle by a slight curve, rising again near the end, which is rounded off. All the rays are single, tapering, and strongly jointed. The same is the case in the anal, whose first two rays are also enclosed in the same membranous sheath. The figure erroneously shows five rays in the ventrals. There are but four, and an extremely short spine, which is discovered with difficulty.

HAB. The northern coasts of Van Diemen's Land, Port Arthur.

#### BATRACHUS DUBIUS. White?

CH. SPEC. *B. nigro, fuscoque varius, pinnis nigrescentibus, fusco-striatis; dentibus subulato-conicis uniseriatis, in apice tantum maxillæ inferioris duplicatis; filamentis tribus superciliaribus.*

RADI:—Br. 6; D. 3|—19; A. 18; C. 13; P. 22; V. 1|2.

Plate X., figs. 1, 2, natural size.

In the appendix to his 'Journal of a Voyage to New South Wales,' by John White, Esq., published in 1790, the author notices, very briefly, a fish about six inches long, under the title of *Lophius dubius: nigricans subus palidus*. He says nothing more of it than that the "general colour is a very deep brown, almost black; the mouth is extremely wide, and furnished with several rows of very sharp teeth. Many ova were found on opening it, which were very large in proportion to the fish." The figure which accompanies this notice is execrable, and almost useless as a means of determining the species. The teeth of the lower jaw are represented as brush-like, or villiform, and we find that, in the *Histoire des Poissons*, White's fish is referred to the *Batrachus Dussumieri*, which has villiform teeth. All the specimens, however, of *Batrachus*, which we have seen from the port of Sidney, where White procured his, belong to a species having the teeth and general form of *B. grunniens*, with colours approaching those of *B. Dussumieri*; and it seems, therefore, fair to conclude, until another species be detected in the same quarter, that this is the fish figured by White, and we have, therefore, given an exact figure, under his specific name.

The *Batrachus dubius* appears to have a wider and thicker body at the pectorals than *grunniens*, and a shorter head, with a larger eye. The teeth are in single rows on the jaws and roof of the mouth, except at the symphysis of the lower jaw, where they are doubled, by the addition of an outer row of four or five on each limb. Their form is between conical and subulate, much shorter, and more slender on the intermaxillaries,\* which reach little more than half way to the corner of the mouth. The lateral ones on the lower jaw are stouter and blunter, and those on the arch of the vomer and palatine bones still more so. Two narrow villiform bands, rather distant from each other, cross the upper pharyngeal bones on each side. A single broader band is opposed to those beneath, on each side. The lips at the roots of the jaw-teeth, without and within, are created by minute, soft, black eminences. The filaments on the head appear to be more numerous than in *grunniens*, but from the extreme laxity of the skin some address is required in ascertaining their true number and form. Mr. Mitchell has exhibited them in the figure very accurately. There are open pores beneath the eye, two or three above the orbit, a cluster at the articulation of the lower jaw, and a row along the disk of the preoperculum. There is no hole in the cheek, behind the corner of the mouth, as in *grunniens*. The mouth does not open farther

\* In *grunniens* the intermaxillary teeth are villiform.—*Histoire des Poissons*.

back than the fore part of the orbit, being proportionally smaller than that of *grunniens*. The upper and under lateral lines are marked by a double row of pores. The upper opercular spine is longer than the under one, which equals the subopercular spine in length. A cartilaginous ray curves upwards from the upper axil of the subopercular spine, and supports the membrane beyond the tip of the lower opercular spine.

The dark parts of the fish are pitch-black, the light parts different shades of brown, approaching on the belly to brownish, or purplish-grey. The light spots on the pectorals form a net-work, with circular meshes.

The first ray of the ventrals is thick at the base, closely jointed, tapers to a fine point, and is bordered with membrane anteriorly. The second is divided and branched. An extremely short spine, that cannot be detected without dissection, is incumbent on the base of the first ray. The second dorsal spine is taller than the third one. All three are distinct at their bases, and are not visible until sought for among the loose skin of the back. The last ray of the dorsal and anal is divided to the base. The anterior rays of the anal are shorter than the rest, and not easily found under their flaccid covering, so that only about sixteen rays show, as in the figure, but there are, in reality, eighteen, all branched at the tips, and jointed. The loose skin in the axil of the rounded pectoral is perforated by a hole, in the specimen figured, but in others the skin is entire at this place.

#### DIMENSIONS.

Length from upper lip (retracted) to end of caudal fin ...	8.20 inches.
" " anus .....	3.70 "
" " tip of gill-cover ..	2.36 "
" " centre of orbit .....	0.55 "
Breadth between the orbits .....	0.62 "
Height of body at pectorals .....	1.88 "
Thickness there .....	1.50 "
Length of caudal fin .....	1.35 "
" pectorals .....	1.75 "

Os. Ad paginam 12, lin. 39, pro "ventrales" lege "verticales."

#### BATRACHUS DIEMENSIS. Lesueur.

CH. SPEC. *B. esquamosus, umbrinus; nebulis punctisque confertis nigro-fuscis; suboperculis bispinosus.*

RADI: B. 6; D. 3½—20; A. 17; C. 15; P. 23; V. 1½.

*Batrachoides diemensis.* Lesueur, Journ. Acad. Nat. Sc. Philad., p. 402.

*Batrachus quadrispinis.* Cuv. et Val. xii., p. 487.

*Batrachus diemensis.* Richardson, Annals Nat. Hist., x. p. 352, description of a dried specimen, imperfect.

Plate VIII., figs. 1 and 2, natural size.

In the Journal of the Academy of Sciences of Philadelphia as quoted above, M. Lesueur has described a *Batrachus* preserved in the gallery of the Jardin des Plantes, at Paris, in a bottle, marked "C C, No. 1." This is most probably the same specimen which is named *B. quadrispinis*, in the *Histoire des Poissons*, and is therein stated to have been brought from the Indian Ocean, by Peron. M. Valenciennes, at least, who has the best opportunity of knowing, considers *diemensis* and *quadrispinis* to be but

one species; and in adopting his opinion, we employ the name which has the right of prior publication, though it is less characteristic. M. Lesueur's description agrees with our specimens, except in the number of superciliary cirrhi, of which he counts only two, and of the anal and pectoral rays; the extreme looseness of the integument, however, exposes the examiner to error in his enumeration of these parts; and had we not had the advantage of inspecting specimens, whose fin-membranes were nearly removed by putrefaction, our reckoning would have been the same as that of the *Histoire des Poissons*.

The profile of the comparatively small head is flatly arched above, the summit of the dorsal curve being at the first dorsal fin, where the body is considerably higher than elsewhere.

The number and position of the cirrhi may be more readily ascertained by an inspection of the figures, than by any description, however elaborate, and we have only to say, that in most cases, if not in all, they are the elongated margins of pores. There are also open pores, without elevated edges, on the under border of the orbit, and on the disk of the preoperculum. Besides the upper and under lateral lines, there is a middle one, with more distant cirriferous pores, which are less easily discovered.

The teeth on the jaws, vomer, and palate bones are very short, and closely villiform. On the lower jaw the dental plate expands forward at the symphysis, and tapers to a point at the corner of the mouth. The internaxillaries form only half the upper border of the mouth, and their teeth are in a single row, except at the symphysis where the series is doubled or trebled. The pharyngeal teeth are longer, more uneven and setaceous than those on the jaws.

The middle dorsal spine is taller than the third one, and they are more separated at the base than they appear to be when seen through the membrane, as they are in our figure. The last rays of the second dorsal and anal are divided to the base. All the rays of these fins are jointed, and the foremost two or three of the anal are short, graduated, and so bound together by membrane, that in the recent fish they will be generally reckoned as only one ray. The three middle filiform branchiostegous rays are so approximated at the base, as to look like branches of one ray, and they separate less in the membrane than the other rays. The subopercular spines are a little shorter than the opercular ones, and the under spine of each piece is only half the length of the upper one. The anus is in the middle of the fish.

After long maceration in spirits, the colours of the darker parts, including the minute dots generally dispersed over the body and fins, are deep umber and liver browns, approaching to black. The lighter parts, including the belly and bars on the tail, are pale broccoli-brown, verging on purplish-grey.

#### DIMENSIONS.

Length from upper lip to end of caudal fin .....	4.25 inches.
" " anus .....	2.12 "
" " gill-opening .....	1.30 "
" " centre of eye .....	0.37 "
Diameter of orbit .....	0.21 "
Height of body .....	1.20 "
Thickness of shoulder .....	0.95 "
Length of caudal fin .....	0.84 "

HAB. The northern and western coasts of Australia, Port Essington; Houtmans Abrolhos, Swan River colony. (We have seen no specimen from Van Diemen's Land).

NOTOTHENIA CORNUCOLA, *vide* p. 8.

CH. SPEC. *N. capite nudo, levi, squamis in regionibus suprascapularibus nullis, operculis superne squamosis; pinnis dorsi contiguis; corpore fusco, vario; genis oblique fasciatis.*

RADI:—Br. 6; D. 5|—32; A. 29; C. 13½; P. 19; V. 1|5.

Plate XI, figs. 3, 4, natural size.

Having, through the kindness of Mr. Gray, had an opportunity of inspecting a collection of Falkland Island fish, I am enabled to give a fuller account of the species of *Notothenia* than I could from Sir James Ross's specimens. The figures of *N. cornucola*, in the former fasciculus, having been taken from worn and mutilated examples, and the ventral fins having, through inadvertence, been altogether omitted (in Plate VIII., fig. 4 and 5), the defect is supplied by more correct representations.

The specimens, which are preserved in spirits, have the back, sides and head of a clear amber, or chestnut-brown colour, varied by a paler yellowish-brown, in a clouded or banded pattern. An oblique pale stripe crosses the fore part of the cheek, and is defined above and below by dark amber brown blotches; the base of the pectoral is crossed by a dark bar, and the hinder part of the first dorsal is black, as in most other species. The space between the ventrals is more scaly than appeared from the injured specimens, but the scales over the whole of that region are small, and deeply imbedded in the mucous skin. The teeth are subulate, and rather long for the size of the individual, as compared with some of the other species. They form two or three rows in the front of the jaws, and merely a single series on the sides. The vena are, as in the others, large, and covered with tumid-lipped pores. Length, six inches.

HAB. Cape Horn, and the Falkland Islands.

NOTOTHENIA VIRGATA. Richardson.

CH. SPEC. *N. capite obeso, nudo, præter tempora et summa opercula squamosa; colore corporis purpureo, punctis violaceis; virga mediana lata et altera in summo dorso tenuiori, pallidis, intaminatis; fasciâ obliquâ in buccâ.*

RADI:—Br. 6; D. 5|—32; A. 29; C. 15½; P. 22; V. 1|5.

Plate XI, figs. 5, 6, natural size.

This *Notothenia* resembles *cornucola* in its naked porous head, the distribution of the scales on the upper border of the operculum, in the cheek stripe, dark mark on the base of the pectoral, and in the numbers of the rays of the vertical fins. It has, however, a fuller bluff head, with large lips, and is well distinguished from it and the other species, by a broad, longitudinal, pale, spotless stripe on the side, and a narrower one adjoining the base of the dorsal. The rest of the side has a plum-purple tint, besprinkled with dark, violet-coloured dots. The head has also a purple hue, and the oblique, pale stripe on the cheek, is bounded

above and below with dark marks. The first dorsal is, as is most usual, black posteriorly; there are small obscure spots on the second dorsal, and a dark line crosses the anal rays near their ends. These colours are described from specimens kept in spirits.

The scales along the middle of the sides are finely and equally ciliated; the teeth of the upper and lower ones are more minute, and are nearly concealed by the epidermis; while, towards the middle of the belly, and on the top of the back, the teeth of the scales become quite obsolete.

The jaws are armed with a single series of slightly curved subulate teeth, which are tallest in front. In the upper jaw only, there are three or four interior teeth in front, as tall as the others. The vena are softly granular and porous, as in other species. The head forms a fourth of the total length of the fish, caudal included, and the height of the body is equal to a fifth of the length. Length, 5½ inches.

HAB. The Falkland Islands.

NOTOTHENIA MARGINATA. Richardson.

CH. SPEC. *N. capite nudo, levi, squamis tantummodo paucis, inconspicuis oculum inter aperturamque summam branchiarum; pinnis dorsi connexis; pinnâ dorsi secundâ pinnâque ani nigro tinctis, marginibus pallidis.*

RADI:—Br. 6; D. 6|—132; A. 28; C. 21; P. 20; V. 1|5.

Plate\* XII, figs. 3, 4, natural size.

This fish has the same kind of bar on the cheek, and line across the base of the pectoral, which we observe in *N. cornucola* and *virgata*, and the head is even less scaly, there being only five or six small deeply imbedded scales scattered along the line of junction of the gill-cover with the cranium. There are none on the supra-scapular regions, and the top of the supra-scapular itself can with difficulty be traced through the integument. Open pores exist on the same parts of the head as in the species named above, viz. across the snout and nape, along the upper hinge of the gill-cover, round the eye, along the limbs of the lower jaw, and up the edge of the preoperculum. One of the nasal openings has an elevated tubular mouth situated just before the eye. If there be a second opening, it cannot be distinguished from a pore. The gill membranes are united beneath, as in the others, the free edge over the isthmus being a segment of a circle. The pale borders of the anal and dorsal fins form a ready distinctive mark of the species. These fins are otherwise blurred or blotched with black, but the colours of the fish have faded in the spirits.

The scales of the body are strongly ciliated, except those which are on the top of the back, and on the belly, and near the anal fin, where the teeth become obsolete. The scales of the lateral line are notched at the tip, and have a tube on the disk. There are forty such scales on the fore part of the line, and ten on the posterior part.

\* It is due to Mr. Mitchell to say, that from a mistake in preparing this plate, which was partly executed in lithotint, the drawings have been considerably injured.

The teeth stand in a single series on both jaws, and are short, subulate, slightly incurved, becoming gradually smaller towards the corners of the mouth. The vela are thickly covered with soft, perforated, granular eminences. The length of the head is contained thrice and three quarters in the total length of the fish, which is  $4\frac{1}{2}$  inches.

HAB. The Falkland Islands.

NOTOTHENIA TESSELLATA. Richardson.

CH. SPEC. *N. squamis levissimis: capite squamoso; corpore sex-fasciato; pinna dorsi tessellata.*

RADI:—Br. 6; D. 6—33; A. 32; C. 21; P. 22; V. 15.

Plate XII., figs. 1, 2, natural size.

This species has a more extensively scaly head than any of the *Nototheniæ* described in the preceding pages. The scales cover the top of the head forward nearly to the nostrils, two-thirds of the cheek, and the whole of the gill-cover, except a narrow margin, which is smooth. The limb of the preoperculum, the whole interoperculum, the preorbitar, end of the snout, maxillaries, jaws, and under surface of the head are also smooth. The opercular scales are larger than the others on the head. The scales on the body are small as compared with those of the other *Nototheniæ*, there being about eighty in a row between the gill-opening and caudal fin. These scales are quite smooth on the edge, no teeth being visible through an eye-glass of considerable power. They are bounded by four slightly convex curves, and one taken from the middle of the side, showed thirteen furrows impressed on the basal half. When *in situ*, they are invested with a thick epidermis, which renders their edges blunt, and they feel smooth to the finger drawn either way over them.

The lateral line is traced on scales which are notched at the tip, and have two pores on the disk, without any visible tubular ridge. The upper line can be traced considerably past the commencement of the lower one. The pores of the head are in the same situations as in the other species. The free edge of the united gill-membranes is curved in the arc of a circle. The length of the head is contained three times and a half in the whole length of the fish. Both jaws are armed with a row of subulate teeth, similar to those of the other species, with two or three much smaller ones behind the front teeth, and curved backwards. The tongue, large and smooth, has a free, rounded tip. The upper and lower vela are glandular.

The original tints have perished during the immersion of the specimen in spirits, but six irregularly wedge-shaped bars can be traced, descending from the back down the sides. The fins generally have a dark ground. The first dorsal is, as usual, mostly deep black, and the second is barred with rows of square spots.

Length, seven inches.

HAB. The Falkland Islands.

NOTOTHENIA SIMA. Richardson.

CH. SPEC. *N. capite depressiusculo parum coucero, squamoso; corpore fasciatis nebuloso; squamis ciliatis.*

RADI:—Br. 6; D. 6—28; A. 28; C. 13 $\frac{1}{2}$ ; V. 15.

Plate XI., figs. 1, 2, natural size.

This *Notothenia* has an extensively scaly depressed head.

The cheek is thickly covered with small scales, except about one-third of it, next to the corner of the mouth, which is naked. On the temples and supra-scapular regions the scales are minute; on the top of the head and opercula they are larger and more deeply imbedded in the skin, and their form and disposition are less regular between the eyes. Most of the scales on the body are ciliated. A row of open pores runs along each limb of the lower jaw, round the preoperculum, along the nape, across the upper edge of the gill-cover, round the orbits, and over the end of the snout, as in most of the other species.

The length of the head is contained thrice and two-thirds, and the height of the body five times and three quarters in the total length. The space between the eyes is narrower than the breadth of the orbit. The teeth are all short, and in front of the jaws are disposed in several rows.

The original colours of the fish have faded, but some dark marks still exist on the cheek and temples. On the upper parts of the body and sides the dark tints have a clouded and banded form. There are dark marks on the base and towards the extremity of the caudal, and some obscure spotting on the other two vertical fins, with a darkening of the membrane near the tips of the rays. The pectorals are obscurely banded; a few spots exist on the ventrals, and the first dorsal exhibits the usual black mark.

Length,  $4\frac{1}{2}$  inches.

HAB. The Falkland Islands.

HARPAGIFER BISPINIS. Vide p. 11.

CH. SPEC. *H. corpore aurantiaco, fasciis tribus fuscis cincto; capite fusco.*

RADI:—Br. 6; D. 4—22 vel 24; A. 17; C. 11 $\frac{1}{2}$ ; P. 17; V. 15.

Plate VII., figs. 1, 2, 3. Plate XII., fig. 8, natural size, fig. 9, magnified.

The specimens from which the generic characters and the detailed description of the species were given in the preceding fasciculus, as referred to above, had been much injured by immersion in brine, and the patterns of colour had nearly perished. Through Mr. Gray's kindness, I have had an opportunity of examining specimens well preserved in spirits, and of making some additions to the account of the species.

The first dorsal in reality contains four spines, the last spine being, in some examples, much more conspicuous than in others. By a re-examination of Sir James Ross's specimens, I detected the fourth spine concealed under the integuments. The last ray of the dorsal and anal is bound down to the tail by membrane, which extends nearly to the base of the caudal. A row of pores runs along each limb of the lower jaw, and round the edge of the preoperculum to the temples. Another crosses the end of the snout, follows the edge of the preorbitar, completely encircles the eye, then continues along the union of the gill-cover with the skull, and, crossing the nape, unites with its fellow. All these pores have elevated tubular



months forming short cirrhi. The structure of the pores on the lateral line is the same. A row of minute and distant pores, without tubular lips, can be traced from behind the pectoral, along the line of origin of the muscles in the middle of the sides, to the caudal fin. The skin on the upper edge of the orbit is tumid, and a small crest, composed of united tubes, with open mouths, rises from its middle. This crest is not uniform, having a more palmated shape in some individuals, while in others the little tubular branchlets stand out on every side. Some variation in size and form is, perhaps, owing to the season at which the specimens were taken, the examples procured by Sir James Ross having but a vestige of the crest, even when the skin is perfect in that part; but it is to be observed, that many of them have the integuments broken there, as if the tubular projections, having been very tender, had worn off more readily than the rest of the integument. The top of the head and shoulders is studded with little round soft grains, and filamentous points, not very visible without the aid of a lens; and a few similar grains exist on the integuments investing the dorsal rays. All these seem to be the tumid lips of minute pores.

The body appears to have been orange, with three irregular dark brown bands descending from the back. The top of the head is dark; the belly and the fore part of the back showing the orange-coloured ground. The second dorsal, pectoral, and caudal, are tessellated by squarish, blackish-brown spots, confined to the membrane. These spots form rows, when the fins are fully extended. There are also some dark specks on the edge of the first dorsal, and a few blotches on the ventrals. The anal is orange, and unspotted.

Length of the specimens generally about three inches.

Obs. One specimen is entirely destitute of a first dorsal, and bears no mark of the back having received any injury. Its second dorsal contains twenty-one articulated rays, and the anal fin eighteen rays.

HAB. The Falkland Islands.

HARPAGIFER PALLIOLATUS. Richardson.

CH. SPEC. *H. strigat albescens ab extremo rostro per summum dorsum ad caudam tractat; lateribus fuscis transverse bifasciatis; corpore infra aurantiaco.*

RADI:—Br. 6; D. 3|—22; A. 17; C. 11½; P. 16; V. 1½.

Plate XII., figs. 5, 6, 7, natural size.\*

I have seen only one example of this form of *Harpagifer*, and am not convinced of its being specifically distinct from *bispinis*, notwithstanding the very different way in which it is coloured. It may be a sexual dress merely.

Only three spines can be detected in the first dorsal, and the supraorbital crest seems to be composed of a single conical tube. In all other parts of external structure, the resemblance to *bispinis* is extremely close. The subopercular spine is acutely pointed. In *bispinis* this spine is sometimes acute, sometimes notched at the tip. The only

reason for giving this fish a distinct name, is the milk-white streak which commences on the symphysis of the upper jaw, and runs along the middle of the head and back to the tail, sending one band down the side towards the anus, and another at the end of the second dorsal. The maxillaries are also white. The ground-colour of the head and sides is greyish-black, fading on the flanks to hair brown. The under surface and the fins are marked as in *bispinis*.

A small crenated flap projects from the fore edge of the anus, rather more conspicuously than in the ordinary examples of *bispinis*, and there is a minute genital tubercle behind, as shown in figure 7.

Length, 2·62 inches. Length from tip of upper lip to anus, 1·30 inches.

HAB. The Falklands.

PATÆCUS. Richardson, Ann. Nat. Hist. for Oct. 1844, vol. xiv. p. 280.

CH. GEN. *Forma compressissima, circumscriptione laterali semiparabolica; facie frontatâ oblique retrò descendenti.*

*Os parvum, rictu ferè horizontali parum declivi. Maxilla inferior porosa, cirris minimis parèe pedita.*

*Dentes minutissimi, arenacei in maxillis utrisque, ossibusque pharyngæ stipati. Lingua, vomer, palatumque læves.*

*Oculi laterales in summâ genâ positi.*

*Ossa capitis operculorumque inermia, sulcatim insculpta.*

*Os preorbitale membro tenui verticali: disco infero dilatato, insculpto. Catenula suborbitalis membranacea tubulata, nec ossæ, oculo remota, e disco preorbitalis ad tempora genam transcurrentes.*

*Apertura branchialis ampla, posticè infraque etiam intra ramum maxillæ inferioris ad mentem usque extensa, super operculum clausa. Membrana branchiostega supernè apiculata, infra non ischio annexa nec cum pari suo conjugata, radis sex sustentata.*

*Squame nullæ. Cutis tenuissimus. Linea lateralis posticè summum dorsum attingens. Anus medianus, papilla nulla.*

*Pinnæ pectorales satis magnæ, pauciradiatæ, humiles, positione forsitanque functione ventrales pinnas quæ desunt simulantur; radii tenuibus indivisis omnibus articulatis.*

*Pinna dorsæ pinnam dorsalem Agriopi referens, per totum dorsum ab extremo fronte ante oculos ad pinnam caudæ usque cum membrana connexa regnans: radii articulatis ejus et pinnæ antè attenuatis rix a radiis non articularibus, flexilibus, numerosioribus oculo nudo dignoscendis.*

*Pinna antè a pinnâ caudæ discretæ. Radii pinnæ caudæ indivisi, tenues, articulati.*

*Vertebræ circiter 35, quarum 18 ad caudam pertinentes.*

PATÆCUS FRONTO. Richardson.

*Patecus fronto, species unica adhuc cognita.*

RADI:—Br. 6; D. 24|16; A. 11|15; C. 10; P. 8.

Plate XIII., figs. 1, 2, natural size.

We have seen but a single example of this very curious

\* The figures are blurred in printing, from the cause already mentioned.

fish, which was dried without any preparation whatever. From the extreme thinness of the body, this plan has answered pretty well, and there does not appear to have been any material alteration of the natural form. The specimen was presented to the British Museum, by His Excellency Captain George Grey, Governor of South Australia. On account of the flexibility of its spinous rays, it ought probably to be ranged with the *Gobiidae*, among which there is already another apodal genus, viz. *Anarrhichthes*, but it does not possess a genital papilla, and the internal anatomy is unknown. In external form, and in the general appearance and sculpturing of the bones of the head, *Patecus* has some analogy to *Agriopus*, just as *Chenichthys* resembles *Trigla*. The habits of the fish are unknown to us.

This fish is very much compressed, thinning off on the dorsal line to the mere thickness of the bases of the dorsal rays, but being obtuse on the belly, before the anus. The upper profile is parabolic, the curve rising from the overhanging forehead to its summit at the twelfth ray, which is opposite to the base of the pectorals. The descent to the caudal fin is longer, and more gradual. The face, in descending towards the month, inclines considerably backwards, in a slightly concave line. The rictus of the mouth is nearly horizontal; the under jaw is equal in length to the upper one, and lies nearly in a straight line with the thorax and belly, as far as the anus. There is a little ascent from the anus to the horizontal under profile of the tail. The height of the posterior part of the tail is scarcely one-eighth of that of the body at the pectorals. The greatest thickness of the fish appears to be at the convex gill-covers, and the compression to augment posteriorly, but as the specimen has been dried, the exact thickness at the shoulder cannot be ascertained. The anus is midway between the upper lip and the base of the caudal.

The head, measured from the brow to the gill-opening, forms nearly a third of the total length, caudal excluded. It is extremely narrow, on a front view presenting nothing but the thin edges of the frontal bones, connected by a narrow stripe of membrane, which, in the dried specimen, forms a furrow, the eyes and nostrils being entirely lateral. The eyes are high up on the cheeks, and the nostrils, which are minute, are nearer the profile. The upper opening is between two descending processes of the anterior frontal, and the lower one, which has a tubular margin, is about half way between the eye and the upper lip.

The month, small and low down, is formed above entirely by the internaxillaries, which are moderately protractile, their pedicles being about half as long as the limbs. The maxillaries widen gradually towards their lower rounded ends, and are longitudinally sculptured. The lower jaw equals the upper one in length, and its limbs are porous beneath, several of the pores having projecting lips forming minute barbels. The internaxillaries and lower jaw are armed with very minute teeth, like grains of sand, densely crowded into a moderately wide band. The vomer and palate-bones are smooth. The pharyngeal bones and the sessile hemispherical rakers are armed with nearly microscopical villiform teeth.

The suborbital chain appears to be a mere row of membranous tubes, curving across the cheek from the temples at a considerable distance beneath the eye. The preor-

bitar is, however, well developed, and presents, close to the month, an oval bony disk, sculptured in a stelliform manner. A narrow process rises from before the cheek, to meet a point of the anterior frontal, near the angle of the eye; there is a minute point or tooth on the same side of the disk, in connexion with the suborbital chain; two others, equally small, exist on the other side, next the maxillary, and the two ends of the disk are obtuse. The bone is level with the integument, and does not cover any part of the maxillary.

The frontal bone is arched over the eye, and is entirely lateral, its thin edge only being seen above or anteriorly. It is sculptured, as are also the occipital and suprascapular bones. The preoperculum is curved elliptically, its upper limb being widest, and somewhat triangular; the narrower under limb descends considerably, as it runs forward to the angle of the month. At the union of the limbs, posteriorly, there is a small corner, rendered more distinct by the course of the lines on its surface. The edge of the bone is otherwise entire. The interoperculum ascends obliquely as it runs backwards, and widens posteriorly in a spatulate manner. The operculum comes in forwards for nearly half its length above the upper disk of the preoperculum, and the lines on its surface run towards two distinct points on its posterior margin. The suboperculum is rather over than behind the interoperculum, and has a nearly rectangular disk. All these bones are sculptured, as is also the humeral chain, but none have either pungent teeth, or serratures.

The gill-membrane edges the gill-cover, and ends at the upper angle, in a small peak, with a notch anterior to it. It is supported by six rays, the upper one curving round the opercular bones to the upper angle. The opening runs under the throat up to the chin, the membrane having no attachment to the isthmus, and no connexion with its fellow, except at the point of attachment to the lower jaw.

The dorsal fin commences at the anterior top of the forehead, before the eye, and reaches to the end of the tail, being united to the caudal fin. Its spinous rays are rather stout at the base, particularly anteriorly, but flexible at the tips. The second, third, and fourth are tallest; the following ones become gradually shorter to the fifteenth or sixteenth, after which they increase in length on to the eighth articulated ray. This gradation of the rays, conjoined with the curve of the back, gives an almost straight, or slightly concave line to the edge of the fin, with a rounding off towards the end of the tail.

The jointed rays taper, and are not readily distinguishable by the naked eye from the posterior spinous ones. There are two or three pairs of minute membranous processes on the side of the second dorsal ray, and one pair on the third ray. The caudal fin is slightly rounded at the end, eight of its rays being nearly of the same length, while the two lower ones are shorter and graduated. The anal fin, with considerably less height than the posterior part of the dorsal, approaches to it in form. It is not connected with the caudal, but the last ray is bound to the tail by membrane. The pectorals are large, over-reaching the anterior third of the anal, and are attached near to the ventral surface. Their rays are slender and tapering, with the tips



slightly projecting, particularly the lower ones. The rays appear simple at first sight, but are not so, each having two closely adhering branches.

The skin is perfectly smooth, and appears to have been mucous when recent. Its colour, when dried, is yellowish-brown, and there are three pale spots on each side of the back, above the lateral line: one under the sixteenth and seventeenth rays, the second under the twenty-seventh and twenty-eighth rays, and the third and smallest on the base of the thirty-fourth dorsal ray. The dorsal fin is clouded, and some minute speckling can be traced on the other fins. There are about thirty-four or thirty-five vertebrae, as nearly as they can be counted through the integuments.

#### DIMENSIONS.

Length from upper lip to end of caudal fin .....	8 75 inches.
"    "    base of ditto .....	7 00 "
"    "    anus .....	3 70 "
Height of body at eleventh dorsal ray .....	3 00 "
"    second dorsal ray .....	2 75 "
Length of pectorals .....	3 00 "

HAB. South Australia.

#### SCORPÆNA MILITARIS. Richardson.

CH. SPEC. *Sc. spinis capitis fere Scorpænae porci vel bufonis; carinis intra-orbitalibus levibus, apicibus pungentibus; operculo summo, temporibus, genisque squamosis; orbitis superne forte tridentatis, cirrho unico parvo; cirrhis quoque nasalibus; colore carmesino; pinna dorsali spinosa riuatula cum macula nigra oblonga ad marginem pone medium.*

RADI:—Br. 7; D. 12½; A. 3½; C. 12½; P. 17; V. 1½.

*Scorpæna cruenta*, Solander, MSS. ? Rich. Annals Nat. Hist. for May, 1842, p. 217. *Scorpæna militaris*, Rich. Zool. Trans., iii, p. 90. *Scorpæna ergastulorum*, Idem, Annals of Nat. Hist., May, 1842, p. 217. Soldier fish of the colonists of Tasmania.

#### Plate XIV., figs. 1, 2, natural size.

In Solander's MSS., preserved in the Banksian library, there is an account of the colours of a *Scorpæna cruenta*, taken off Cape Kidnappers, New Zealand, on Cook's first voyage. This is not accompanied by a figure, or any description of form. In June, 1839, I read an account of a collection of fish made at Port Van Diemen's Land, before the Zoological Society, in which a *Scorpæna militaris* was described from specimens which had lost their markings, and had been otherwise injured by deterioration of the spirit in which they were immersed. From this cause, the black mark on the dorsal was effaced, and I did not recognize it as corresponding with Solander's description of *cruenta*. In a paper on Australian fish, published in the Annals of Natural History, in 1842 and 1843, I described a drawing made by a convict at Port Arthur, of a *Scorpæna*, which I named provisionally *ergastulorum*, placing it in juxtaposition with Solander's *cruenta*; but being unable, from defects in the drawing, to identify it with that or any other species that had been described. A more perfect specimen in the present collection is represented in Plate XIV., and appears to justify the reference of the synonymy above collected, to one species. There

was no trace left in the specimen of the blood-red mark on the soft dorsal, mentioned by Solander, but it may, nevertheless, have existed in the recent fish, or may be a mark assumed in the spawning season. The following is Solander's account of the colours of the living fish:—

"*Corpus saturatè sed obscurè rubrum, nebulis subfasciatis paucis pallidè lutescentibus pictum, subtus dilutè sanguineum. Caput superne et latere purpurascens-rubicundum, subtus dilutè sanguineum, nebulis albis. Iris rubro-argentea. Pupilla nigra. Pinnae dorsales pars prima obscurè rubra, rivalis paucis, subpellucidis, posticè nebula nigra, oblonga; pars posterior anticè, prope basin maculà intensè sanguineà notata, alias rubicunda maculis nigricantibus adpersa. Pinna ventralis sanguinea, maculis paucis nigris. Pinna caudalis rotundata, rubra, maculis nigris in quatuor fasciis per radios dispositis ornata: membrana connectens immaculata.*" (Solander, *Pisces Australia*, MSS., p. 5).

The form of the fish is fully described in the Zoological Transactions, as above quoted.

Length of specimen, six inches.

HAB. Coasts of Van Diemen's Land, and of New Zealand.

#### SCORPÆNA BYNOENSIS. Richardson.

CH. SPEC. *Sc. capite brevi alto cum corpore cirrhis plurimis parvis ornato; pinna pectorali guttis lacteis seriatim fasciatà; pinna albis, corpore, et capite nebulis albis variis.*

RADI:—Br. 7; D. 12½; A. 3½; C. 12½; P. 17; V. 1½.

#### Plate XIV., figs. 3, 4, 5, natural size.

This species was discovered by Benjamin Bynoe, Esq., while serving as surgeon of the Beagle, on the north-west coast of Australia, and seems to differ from all the *Scorpænae* that have been hitherto figured.

The scales on the head are confined to the upper part of the gill-cover and temples, the cheeks above the preorbital ridge being smooth and scaleless. There is, perhaps, a single row of very minute scales close to the ridge beneath, but the rest of the cheek is perfectly smooth. The intra-orbital ridges are little marked, and are not terminated by spinous points; the middle supra-orbital tooth, though pretty large, is depressed, and inclined inwards. The cirrhi are very numerous, but none of them are large. A bushy one, and many smaller filaments, rise from the orbit, a similar one from the anterior nostril, and many which are more or less fringed or lobed from almost all the prominent corners of the head. One of the most conspicuous is attached to the posterior corner of the preorbital. The lateral line, and the body throughout, are fringed by numerous simple filaments. The colour in spirits is brown, deepening into dark under on the cheek, the top of the head, spots on the gill-cover, and a large patch under the second dorsal. The rest of the body is of a lighter brown, relieved by white marks, which in some places are opaque milk-white, such as the rows on the pectoral, the larger spots on the anal, the axilla of the pectoral, and along the belly. The filaments also on the head and body are mostly opaque white. The distribution of the markings elsewhere

will be best understood by a reference to the figure. There are eleven simple rays in the pectoral.

Length, 2·80 inches.

HAB. North-west coast of Australia.

SERASTES PERCOIDES. Richardson.

RADI:—Br. 7·7; D. 12½ vel 13; A. 3½; C. 11½; P. 11 et viii.; V. 1½.

*Scorpena percoides*, Solander, MSS. Parkinson, Icon. ined. Bibl. Banks, pl. 16. *Sebastes maculatus*, Richardson, Zoological Transactions, iii. p. 93. *Sebastes percoides*, Solander, Annals of Nat. Hist. for July, 1842, p. 384.

Plate XV., figs. 1, 2, natural size.

In the third volume of the Zoological Transactions, I described this species at length as to form, referring it to the Cape *Sebastes maculatus*, which at that time I knew only from the short notice of the species contained in the *Histoire des Poissons*. A well-preserved specimen, brought from New Zealand by Sir James Ross, and still retaining much of its proper markings, enables me to identify the fish with the *Scorpena percoides* of Solander, and the publication of Dr. Andrew Smith's figure of *Sebastes maculatus*, in his 'Zoology of South Africa' (Plate 22, upper figure), has shown that I was in error, in supposing that the Australian and Cape *Sebastes* were the same. I have, therefore, the pleasure of giving a correct figure, under Solander's original specific name. Some of the bands of dark colour, especially one across the head, and another in the shoulder, have faded in the spirits, and Solander's account of the recent tints ought, therefore, to be referred to in the 'Annals of Natural History,' as above quoted.

*Sebastes maculatus* has a much lower spinous dorsal, and smaller ventrals, a smaller eye, and less acutely spinous head, than *S. percoides*.

Length, 9½ inches.

HAB. New Zealand, Van Diemen's Land, and Port Jackson.

PLATYCEPHALUS TASMANIUS. Richardson.

CHAR. SPEC. *Pl. osse preorbitali unidentato; orbita levi; spina preoperculi inferiori, longiori; corpore, pinnisque pectoris, dorsi et caudæ maculatis.*

RADI:—B. 7; D. 1·6½—14; A. 14; C. 13½; P. 12 et vi.; V. 1½.

*Platycephalus tasmanius*, Richardson, Zool. Trans., vol. iii. p. 97.

Plate XVIII., figs. 1, 2, natural size.

This fish is fully described in the Zoological Transactions above quoted. I there noticed its near approach to *Platycephalus bassensis*, characterised in the *Histoire des Poissons*, and figured by Quoy and Gaimard in the 'Zoology of the Voyage of the Astrolabe' (Plate 10, fig. 3). It agrees with that species in the relative size of the preopercular spines, but differs in having only one small spinous point on the preorbitar, instead of two; and no tooth whatever on the margin of the orbit. In the skeleton of *tasmanius*, a slight rib is visible in the preorbitar bone, but it does not project beyond the edge. These minute differences of structure, though not established by an examination of an

authentic specimen of *bassensis*, but merely gathered from the works referred to, being conjoined with considerable discrepancy in the size and distribution of the spots of colour, have induced me to keep the species separate. With the exception of a slight variation in the numbers of the rays, the characters are constant in a considerable number of examples of *tasmanius*.

Size, from eight to eighteen inches in length.

HAB. Coasts of Van Diemen's Land.

TRIGLA PLEURACANTHICA. Richardson.

CH. SPEC. *Tr. fossa dorsali et lineâ laterali validè armatis; squamis corporis, basi flabellatis, lateribus concavis, posticè cordatis, apiculatis, carinatis; orbitis anticè tridentatis; facie parum concava.*

RADI:—Br. 7; D. 9½—14; A. 14; C. 9½; P. 11 et iii.; V. 1½.

Plate XVI., figs. 1, 2, natural size; 3, 4, magnified.

This gurnard belongs to the same group with *Trigla aspera*, or the *Cavillone* of the Mediterranean; and of the three species of the Indian Ocean, described in the *Histoire des Poissons*, it approaches most closely to the *Trigla papilio* (p. 80, pl. 73). It has the same kind of spinous armature at the base of the dorsal fins and on the lateral line, with much resemblance in the shape of the other scales, and agrees with it in the numbers of the rays. It differs from this and the rest of the group, in the greater size of the lateral spines, in the form of the air-bladder, and in other particulars, which are mentioned in the following description.

The face is not so even as that of *papilio*, but is slightly concave, and has a greater slope. The snout is rounded, with a scarcely perceptible notch at the mesial line, and no other points or teeth than the roughness of the bone, which, on the head generally, is produced by fine, short, parallel ridges. The membranous space over the intermaxillary pedicles is very small. There are three teeth on the upper anterior part of the orbit; the rest of the superciliary ridge is rough, and just behind the eye the rough points are more crowded and bristling. The interorbital space is deeply concave, and its bottom, less rough than the other parts of the skull, is marked by rows of fine round grains. The vault of each orbit is longitudinally ridged. There is a deep crevice behind each eye, connected by a cross furrow on the top of the head. The small ridges are much crowded on the occiput and snout, so that no definite arrangement can be traced; but on the cheek and gill-cover, the ridges are parallel and horizontal, with various irregular, smooth, nary lines under the eye, and elsewhere. The interoperculum has a squarish projecting process; the ascending limb of the preoperculum is slightly concave on the edge; the corner is angular, and projects slightly, and the under limb is convex. There are three or four minute teeth on the corner of the bone, but nothing nearly so conspicuous as the four preopercular teeth, represented in the figure of *Tr. papilio* (*Hist. des Poiss.*, pl. 73), and the whole form of the preoperculum and suboperculum differs in the two species. The notch between the angular points of the operculum is

deeper than in *papilio*, and the under point only is spinous. The supra-scapular and coracoid bones have the same form as in *papilio*, viz., they have a central ridge, which ends in an acute point, and the surface is rough, as in the other bones of the head. The opercular spines have no such ridge proceeding from them. The humeral bone is oval, and smoother than any other bones about the gill-opening or head.

The spinous tips of the interosseous bones which arm the dorsal furrow, are twenty-two on each side, and are acute and trenchant, except three or four anterior ones, which are more or less compound. The spinous scales of the lateral line correspond with the description given of those of *Tr. papilio*, but the chief spine of each is larger and more trenchant than the lateral spines of any *Trigla* of which I have seen specimens or representations. In plate XVI., figs. 3 and 4, the scales are turned upside down, and they belong to the left side of the fish. They correspond in number with those of *papilio*, being fifty-five. The lateral line forks on the caudal fin very remarkably.

The scales of the body, when *in situ*, present small rhomboidal or nearly rectangular disks. When detached, they have generally a dilated, fan-streaked, five or six-lobed base, concavely curved sides, and a heart-shaped, apiculated disk, with an acute line or ridge from the apex to the centre. In some parts, near the lateral line for instance, the scales are oblique, and have more elongated tips, and on the back some have two points. The concentric lines of structure are very indistinct, especially near the edges of the scale, which are not toothed, their structure being apparently *etenoid*.\* The scales of *Tr. papilio* are described as being nearly like the above, but with two points; those of *phatena* and *sphinx* have rounded, not hollow sides. Judging from the figure of *papilio*, in the *Histoire des Poissons*, the scales on the flanks of *pleurocauthica* are smaller than those of any of the species with which we have compared it.

The first dorsal is less rounded, and has a more parabolic outline than that of *papilio*. The spinous rays are not so irregular and suddenly bent. The third spine is the tallest, and the first two are serrated in front by a single row of compressed teeth. The last rays of the second dorsal and anal are divided to the base.

The specimens have been greatly injured by the deterioration of the spirit in which they were immersed, so that the fin-membranes have nearly perished, and the tints of colour are quite lost; but there appear to be some traces left of a black spot on the fourth, fifth, and sixth spines of the first dorsal.

The air-bladder is of an oval form, and of the size of a small pea. It is divided for nearly a third of its length into two conical lobes, one of which is obtuse, the other more pointed. At the other end of the bladder there is a short, narrow, cylindrical projection, which divides the two lateral muscles that fringe the viscus.

The specimens are six inches long, of which the head forms exactly one-fourth.

The air-bladder is in length 0.31 inches, and in breadth, 0.22.

HAB. Sidney Cove, Port Jackson.

DATNIA? CAUDAVITTATA. Richardson.

CH. SPEC. *D. dorso lateribusque maculis parvis crebris nigro-fuscis aspersis; pinna dorsi guttata et anticè ad marginem maculo nigro notatâ; pinna caudæ utrinque nigro-fusciatâ.*

RADI:—Br. 6—6; D. 13|9; A. 3|8; C. 13½; P. 15; V. 1|5.

Plate XVIII., figs. 3, 4, 5.

This fish differs from the typical *Datnia argentea*, in having more slender dorsal spines, and a porous lower jaw; and from the group of *Therapon*, *Datnia*, *Pelates* and *Helotes*, in its air-bladder being simple, and not divided by a narrow neck into two parts. The air-bladder of our specimen is an inch and a quarter long, very obtuse at one end, and tapering to an acute point at the other. Its thick end is marked by two shallow furrows, producing three slightly prominent rounded lobes. Its coats are nacre, and very distinctly fibrous, the outer layer of fibres encircling the viscus transversely, and the inner one longitudinally. In the condition in which the specimen was, having been long macerated in spirits, these fibres separated by a touch. The anal orifice is small, with plaited lips, and immediately behind it there is a minute tumid papilla, not raised above the neighbouring level, but bounded posteriorly by a deep sinus. This papilla is pierced by an orifice, which permits a bristle to pass into the abdomen, but the intestines having perished, the origin of its duct could not be ascertained.

The height of this fish is equal to one-third of its total length, being proportionably less than in *D. argentea*. The thickness of the body is about a third of the height, and the head forms about a fourth of the whole length. The profile ascends obliquely, from the rather acute snout, almost in a straight line to the nape, where it rounds off into the dorsal hump, whose summit is at the fourth or fifth dorsal spine, and opposite to the attachment of the ventrals.\* The eyes round, moderately large, and close to the profile, without interfering with it, are nearly a diameter of the orbit apart from each other. The jaws, gill-membrane, preorbitar, and the top of the head, back to the temples, are scaleless. Two acute, smooth ridges run from the nostrils to the scaly surface on the hind head, about as distant from each other as each of them is from the edge of the orbit of the same side. A mesial ridge commences anteriorly, but sinks to the level of the skull between the eyes, reappearing again behind these organs, and running well back on the scaly nape. The posterior frontal is marked immediately behind the eye by some short, branching, elevated lines, turning obliquely outwards. These ridges are all smooth, and are nearly concealed by the integuments in the recent fish.

The internaxillaries are scarcely protracile; but the maxillaries, except a very small corner, can be concealed

\* By mistake, a second spinous scale from the lateral line was drawn, instead of one of the smaller ones from the flanks.

\* In *Datnia argentea*, the ventrals are farther forward.

beneath the preorbital. The lower jaw is perforated by two small pores on each side of the chin; and three clusters of still smaller ones on each limb of the jaw, containing from five to eight or ten in each cluster. The teeth are disposed in pretty broad, densely villiform bands on the jaws, divided at the symphyses by a fine smooth line. Those of the outer row above and below are subulate, a little taller than the rest, incurved at the tips, and pretty closely set. There are no teeth on the palate, vomer, or tongue. A few very minute papillae are visible on the chevron of the vomer, but the roof of the mouth is smooth, and without plaits.

The preorbital, preoperculum, interoperculum, suboperculum, and supra-axillary plate of the coracoid bone, are all regularly serrated on their edges. The cheek, having a squarish, or slightly rhomboidal form, and a height exceeding the diameter of the orbit, is densely covered with small scales. The scales on the interoperculum and gill-cover are larger. The disk of the preoperculum is a narrow crescent, with the upper limb longer than the lower one. The teeth of the lower limb are very minute, and incline slightly forwards; those of the upper one point obliquely upwards; and towards the middle of the curve, they become sensibly larger. These teeth, as well as those on the other opercular pieces, have intervening acute furrows running a short way on the surface of the bone, but all this is concealed in the recent fish, by the nacreous integument. The operculum is notched at its apex by a crescentic sinus, with acute flat tips, the lower of which is the largest. There are from seven to ten or more teeth on the supra-axillary plate of the coracoid bone, the number of teeth varying in different individuals. A patch of scales exists in the middle of the plate, the rest of its disk being clothed with nacreous skin. The scapula is oblong, smooth and entire, but the supra-scapular bone is entirely covered by the scales, which do not differ from the others.

The scales are strongly ciliated, and present, when *in situ*, a rhomboidal disk. The lateral line is traced within the upper third of the height, and parallel to the back, as far as the end of the dorsal, where it makes a short curve downwards, and pursues its course along the middle of the tail. It is composed of fifty-four scales, exclusive of some small ones on the base of the caudal, and there are about twenty rows of scales in the vertical height of the body. A fillet of scales runs along the base of the dorsal and anal fins, spreading more broadly on the jointed rays, but not concealing the spines when recumbent.

The spinous part of the dorsal fin is much arched, the fifth and sixth spines being the tallest, and exceeding half the height of the body. The spines are alternately right and left, and diminish in height from the sixth to the last, which is as short as the third one. Their height and thickness varies a little in different individuals. The soft rays are even, and higher than the posterior spines, and the last one is divided to the base. The second and third anal spines are equal to each other, and nearly twice the height of the first one, but are overtopped by the soft part of the fin, which is shaped like the corresponding part of the dorsal. The ventrals are under the middle of the pectorals, or fourth dorsal spine. The caudal is shallowly crescentic at the end.

The colours of the fish have, doubtless, undergone considerable alteration from maceration in spirits, but the scales still retain a bright silvery lustre, with lines corresponding to the number of rows. This silvery hue is unstained on the belly. The top of the head, back, and upper part of the sides, have a brownish tinge, and are thickly speckled with darker brown spots, which become gradually effaced on the sides. There is a dark mark under the eye, and two or three rows of brown spots exist on the dorsal and base of the caudal. The upper edge of the soft dorsal is marked anteriorly by a dark patch,\* and a broad jet-black bar crosses each horn of the crescent of the tail obliquely. There are also two brown longitudinal bars in the middle of the tail.

The length of the longest specimen is six inches.

HAB. Harvey River (fresh water), Western Australia. Good specimens were presented to the Museum at Haslar, by Mr. Bynoe, and also by J. Gould, Esq., the author of the Ornithology of Australia.

DATNIA? AMBIGUA. Richardson.

RADI:—Br. 6; D. 10<sup>1</sup>/<sub>2</sub>—11; A. 3<sup>1</sup>/<sub>2</sub>; C. 15<sup>1</sup>/<sub>2</sub>; P. 16; V. 1<sup>1</sup>/<sub>2</sub>.

Plate XIX., natural size.

I have had much doubt as to whether this fish should be placed in the genus *Dales*, or *Datnia*. It agrees with the group of *Dales* which have two opercular points, in the number of dorsal rays, and in the presence of palatine teeth, but in general habit it is more like *Datnia*, strongly resembling it in the strength of its dorsal and anal spines, and in the number of rays in the anal. The only two specimens that I have had an opportunity of examining are dried, and are both mutilated in the caudal fin, so that I am unable to describe the form of that member, and can give no anatomical details.

Form compressed, the thickness of the body being about half the height, which is greatest at the commencement of the dorsal, and a little exceeds one-third of the length of the body, caudal excluded. The back is more acute than the belly, and the pelvic region is flat. In profile the upper curve much exceeds the ventral one. The shoulder is rounded, the face concave, and the descent of the profile, from the dorsal fin, considerable, the mouth being in the lower third of the height.

The length of the head equals the height of the body, and the tip of the gill-cover is in the line of mid-height. The nape is considerably elevated above the scapular regions. The small round orbit, having a diameter of only one-sixth of the length of the head, is close to the profile, and its diameter is one-third less than the slightly convex space between the eyes. The anterior and smaller nostril is placed midway between the eye and the tip of the snout. The top of the head is scaleless, and the bones of the cranium show through the dried skin, but exhibit no peculiar sculpture. The maxillary is wide and truncated at its lower end, and narrows gradually to its articulating extremity. The lips fold back on the jaws, and

\* This patch is omitted in the figure.



do not appear to have been thick. The teeth are short, and densely villiform in rather broad bands on the jaws, vomer, and palate bones, without canines.

The under jaw shows a small pore on each side of the symphysis, and three larger ones on each limb. This bone, the jaws, the preorbitar, the very narrow suborbitar chain, and the top of the head, are scaleless. The oblong preorbitar is rounded anteriorly, and has a wide shallow curve on its lower edge, which is regularly serrated. The cheek is densely scaly forwards to the maxillary, having thirteen rows of scales between the eye and the curve of the preoperculum, and there is a cluster of small scales behind the eye, adjoining the narrow suborbitar chain. The disk of the preoperculum is bounded towards the cheek by a smooth narrow ridge, or line, but is clothed by some minute scales, and its outer edge is serrated. The teeth of the upper limb are small and regular, while those at the slightly rounded corner, and on the under limb, are large, inclined forwards, and divided into three or four groups. The scales on the gill-cover are larger than those on the cheek, and hide the union of the operculum and suboperculum. The spinous point of the operculum is flat and acute, and does not reach beyond the membranous edging of the gill-cover. The bone is sloped away above it by an oblique shallow notch, which ends in a smaller spinous point, situated further forward than the under one. There is a notch at the meeting of the interoperculum and suboperculum. The scaly supra-scapular space is bounded by a smooth line, the scapula is toothed on the edge, and the octangular disk of the coracoid bone above the pectoral is scaly, and its edge toothed. The gill-membrane is partially scaly.

The scales are reticulated on the exterior border, and finely ciliated, but they feel only slightly rough when the finger is drawn forwards over them. Fifty-two scales, distinguished by a small tube on each, compose the lateral line, as far as the base of the caudal, but smaller scales extend half way up that fin.

The strong dorsal and anal spines are alternately right and left. The third anal spine is rather longer, but scarcely so stout as the second. The last soft rays of both fins are divided to the base, the fins move in scaly grooves, and are also clothed with scales for some way up. The base of the pectoral is also scaly. The ventrals end in filamentous tips, and have an elongated scale in the axilla.

The smaller specimen is figured of the natural size on the plate, and has the following

#### DIMENSIONS.

Length from tip of snout to base of caudal fin .....	8.50 inches.
"          anus .....	5.50 "
Greatest height of "body .....	3.30 "

The larger specimen is fourteen inches long, has a more abruptly notched preorbitar, a proportionally longer face, stronger dorsal and anal spines, and a ray fewer in the pectoral, but does not seem to be specifically distinct.

HAB. Western Australia.

#### DIAGRAMMA POROSA. Richardson.

CH. SPEC. *D. porae pinnae dorsi spinosae humili; pinnae ani longae; rostro maxillari inferiori porosis.*

RADI:—B. 7; D. 9|20; A. 3|15; C. 15½; P. 1|20; V. 1|5.

Plate XVI., figs. 5, 6, natural size.

This fish differs from the typical *Diagramma* in several respects, and especially in the lowness of the spinous part of the dorsal, which, when contrasted with the higher, even, soft rays, almost gives it a claim to be ranked among the Scienoids, with two dorsals. The rays of the anal are twice as numerous as those of any species of *Diagramma* mentioned in the *Histoire des Poissons*. Some of the *Pristipomae* approach it in this respect, but in that genus there are no scales on the dorsal or anal.

Form compressed, the greatest height, which is at the ventrals, being nearly thrice the thickness. The profile, exclusive of the trunk of the tail, is unequally ovate, the head forming the obtuse end, and the belly being considerably less arched than the back. The head makes one-third of the total length, caudal excluded. The eye is rather large, and is placed high up, but yet a little removed from the profile, one diameter of the orbit distant from the end of the snout, and two from the tip of the gill-cover. The mouth has a moderately large vertical gape, but is cleft only a short way backwards. The teeth are very small, setaceous, of irregular height, widely set, and in a single row, without canines. There is a narrow velum above and below, which, with the whole inside of the mouth, are studded with glandular points, looking like rows of teeth, but there are, in fact, no teeth on the vomer, or palate. The integuments on the roof of the mouth show a deep narrow mesial furrow, bounded on each side by an acute membranous ridge, on the outside of which there is a shallower groove. These parts are fringed with glands. The pharyngeal teeth are villiform, and somewhat acerose. The outer rakers are slender and setaceous, the others narrow crests, all of them rough. The preorbitar has a straight, inferior, serrated edge, which covers a little of the maxillary. The much rounded preoperculum, and the interoperculum and suboperculum, both of which are convex on the edge, are also serrated. The operculum has two minute, thin, obtuse points, with an oblique angular notch between, all of which are concealed by the scales. The gill-cover is triangular, with a somewhat obtuse tip. The gill-opening is large, and the membrane is supported by seven strongish rays. The cheek, interoperculum, gill-cover and supra-scapulars, are densely covered with small scales; the disk of the preoperculum, preorbitar, lower jaw and rest of the head, including the lines which surround the supra-scapular patches, are covered with porous integument. The two small pores on each side of the symphysis, and the two larger ones on the limb of the lower jaw, which characterise the genus, cannot be distinguished from the rest. There is no pit under the chin, as in *Pristipoma*.

The ventrals, pectorals, and commencement of the dorsal, are in the same vertical line. The fourth dorsal spine is the tallest, and the penultimate one is much shorter than

the last one. The soft rays are longer than any of the spines, and the difference is still greater in the anal, which has also small spines. The fins and the caudal are scaly at the base, and there is a patch of scales on the pectoral. The caudal is notched.

The lateral line curves downwards from its commencement, but not evenly, and becomes horizontal on reaching the end of the dorsal. The scales of the body are concentrically ridged on the uncovered disk. The specimen has entirely lost its original colours during its immersion in spirits, and no markings can be traced, except three rows of alternate dark and light specks on the dorsal, which are not shown in the figure.

Length,  $5\frac{1}{2}$  inches.

HAB. Coasts of Australia.

GLAUCOSOMA? HEBRAICUM. Richardson.

CH. SPEC. *Gl. nigro varium, fucie convexa; radio quarto articulo pinnae dorsali elongato.*

RADI:—Br. 7; D. 8|11; A. 3|9; C. 17 $\frac{1}{2}$ ; P. 16; V. 1|5.

Plate XVII., one-third the natural size.

The ichthyological part of Siebold's *Fauna Japonica*, written by Messrs. C. J. Temminck and H. Schlegel (p. 62, pl. 27), contains an engraving, with a short notice, of a fish of which they had seen no specimen, and knew only from a drawing and description forwarded to them by Mr. Bürger. They state that the fish is taken occasionally in the bays of the south-west coast of Japan, and is much esteemed for its excellent flavour as an article of food. It attains a good size, the individual drawn by Mr. Bürger being two feet in length. They name it *Glaucosoma* from the general tint of the body, and give the numbers of its rays as follows:—Br. 7; D. 9|11; A. 3|9; C. 18; P. 18; V. 1|5. The western coast of Australia is frequented by a fish having precisely the same form of the gill-cover, the same unusual distribution of the scales on the snout, preopercular, maxillaries and lower jaw, and a similar spinous dorsal, remarkable for its lowness and for the gradual increase in the length of its spines from the first to the last, which is much overtopped by the succeeding soft rays.\* In the character of the anal spines, the shape and size of the scales of the body, and in general aspect, the resemblance between the Japanese and Australian species holds good, and we have therefore referred the latter also to the genus *Glaucosoma*, though a few particulars of structure remain to be determined by future observation before this

\* With the exception of *Latilus*, and a few other genera, most of the *Percidae* and *Scienidae* with single dorsals have the spinous part of that fin more or less arched by a gradual shortening of the posterior ones either to the last one or to the penultimate one, thus making an approach to a notched dorsal. Indeed the division of the *Percidae* into those having double or deeply notched dorsals, and those having single ones, would be artificial, were it fully carried out, which it is not in the *Histoire des Poissons*, greater regard being generally had in Cuvier's arrangements to the assemblage of generic characters, than to any isolated feature in a fish. Thus we have some *Diagramme* with a dorsal more deeply notched, than in *Sciænoidei* which are ranked with those having double dorsals, and like instances may be readily adduced from the *Percidae*.

allocation can be final. The Australian fish has two flat bony obtuse points in the operculum, separated by a deep notch, and so buried among the scales that they are not readily seen. No such points are shown in Mr. Bürger's figure of *Glaucosoma*, nor indeed are they distinguished from scales in our plate. A still greater reason for doubt is the silence of Mr. Bürger on the subject of teeth on the vomer and palate. The Australian fish has even a more decidedly Scianoid aspect than the Japanese one, and it may be that Messrs. Temminck and Schlegel ranked *Glaucosoma* in that family more from general character than from precise information of the palate being toothless, as they say nothing about it in the text. Should it eventually prove that the one fish has the roof of the mouth smooth, while the other has it toothed, it will either show that this character must in some cases be dispensed with, if we wish to make families natural assemblages of species, or we must admit that it is the only character by which some *Percidae* can be distinguished from *Sciænoidei*, and of this it is not difficult to find examples among the *Mesoprion*, *Diagramme* and their allies. Another point on which we lack information is the nature of the pharyngeal teeth of the Australian fish. The specimens are merely sections, in which the parts about the throat have been cut away. Mr. Bürger describes the pharyngeal teeth of his fish as being *en papé*. This gentleman's drawing shows scales between the rays of the anal fin, but none on the dorsal, which is most probably an omission. Both fins of the Australian fish are scaly at the base, and it is rare that a fish has the anal scaly, and the dorsal smooth.

No specific name has been assigned to the Japanese fish, but the existence of a second species renders it necessary to supply one, for the convenience of reference, and we propose to do so, by naming it, in honour of its discoverer, *Glaucosoma bürgeri*. The appellation of the Australian species, *Glaucosoma hebraicum*, was suggested by its colonial designation of Jew-fish. In some English possessions fish of small estimation are termed Jew-fish; but we do not know that this is the origin of its trivial name in Western Australia, as we have not received any account of the qualities of the fish, whose size gives it importance, our specimen, from Houtman's Abrolhos, exceeding two feet and a half in length.

According to Cuvier's system of arrangement, *Glaucosoma hebraicum* being a percoid fish with five articulated ventral rays, seven branchiostegous rays, a single dorsal, villiform teeth without canines, and a serrated preoperculum, would enter the genus *Centropristes*, but its habit is totally distinct from that of the typical species, nor does it correspond with any of the other genera, viz. *Grystes*, *Polyprion*, *Pentaceros*, *Acerina* and *Rhypticus* placed in the same group with *Centropristes* in the *Histoire des Poissons*.\*

\* In this work the genus *Centropristes* presents an incongruous assemblage of species. The Rev. Leonard Jenyns has properly removed *C. georgianus* and the species resembling it to a separate genus, which he has named *Aripis*. These species are much like a *Mugil* with a single dorsal, a likeness which Solander seized when he named one of them *Mulloid*. The *Centropristes scorpenoides*, another Australian fish, is also very unlike the American types of the genus. It has the under limb of the preoperculum armed with three strong acute spines, curved



The following general characters assigned to *Glaucosoma* for the present, may be amended when the structure of the fish shall be more fully ascertained.

*Aspectus sciænoideus. Circumscriptio lateralis oblongo-elliptica.*

*Caput satis magnum, obtusiusculum, ferè totum squamosum. Labia membranæque branchiostegæ læres. Os modicum. Pori nulli in maxilla inferiori.*

*Dentes breves, carminiformes; exteriores intermaxillarium et interiores maxillæ inferioris paulo majores. Dentes vomeris et palati conformes sed adhuc minores. Dentes pharyngis parvi?*

*Oculi majusculi laterales, aute medium caput.*

*Nares oculis approximatæ, aperturis magnis rotundis contiguæ.*

*Os preorbitale subgrande genam æquans, margine integerrimo. Preoperculum obtusè curvatum, crenulatum. Suboperculum margine concavum. Operculum obtusissimum apicibus ossibus duobus planis, obtusis, vix conspicuis. Scapula semi-rotundata squamosa, crenulata.*

*Squamæ corporis majusculæ ctenoideæ minutissimè striatæ; rostri et verticis parvæ; maxillæ et genæ majores; operculi interoperculiq; adhuc majores, nec tamen squamas corporis æquant.*

*Linea lateralis ferè recta.*

*Pinnæ pectorales parvæ. Pinnæ ventrales sub axillis pinnae pectoralis postæ. Pinna dorsalis unica; spinæ radiis articularibus breviores; pars articularis ejus pinnaque anti ad basin squamosa. Membrana branchiostegæ radiis septem vel interdum octo sustentata.*

The profile of *Glaucosoma hebraicum* is bounded above and below by nearly similar segments of a flat elliptical curve which meet in a bluntish apex at the mouth. These curves are lost posteriorly in the trunk of the tail. The greatest height of the body is just behind the ventrals, and equals a third of the entire length, caudal included. The height of the trunk of the tail again, where narrowest, is a third of that of the body, and its length is considerable, forming behind the dorsal nearly a fifth of the whole length, but behind the anal scarcely a sixth.

The length of the head and its height at the nape are about equal, and are contained upwards of three times in the length of the fish. The opening of the month scarcely extends backwards to beneath the nostrils, and it descends nearly at an angle of 45° when closed, its apex then being on a level with the middle height of the head and body. The maxillary, which is densely scaly, dilates gradually to its wide and truncated lower end. Its lower corner reaches to beneath the posterior third of the eye. The intermaxillaries are but slightly protractile, and the lower jaw, when depressed, projects beyond them. The dental

surface is broadest towards the apex of the jaws, narrows at the corners of the month, and is interrupted by a narrow smooth space at the symphyses above and below. The dentition may be described as card-like, the individual teeth being subulate, curved backwards, and short, the exterior rows above and the interior ones below being just perceptibly larger. On the limbs of the jaws the dental surface is about five teeth wide above, and three or four below. A narrow velum exists in both jaws. The vomerine and palatine teeth are more minute, but otherwise similar. The palatine teeth form a very narrow band on the edge of the bone.

The nostrils are two round contiguous openings on each side, situated close before the eye in a narrow membranous space. The posterior opening is the largest, and is of considerable size.

The large, round eye is situated high on the cheek, but does not touch on the profile, the frontal region above it being convex both transversely and longitudinally. The preorbitar is well developed, having a vertical height equal to the diameter of the orbit, and a length two and a half times greater. It is densely scaly, and is on a level with the cheek, so that its posterior boundary cannot be defined. Its anterior edge is thin, curved with a slight convexity, entire and slightly free, but does not cover more than the mere edge of the maxillary. The space at the corner of the month, over which the limb of the maxillary passes, is smooth and scaleless. The scales of the cheek advance to the edge of the orbit, and completely conceal the suborbitar chain; and they extend over the temples to the side of the head, and cover the disk of the preoperculum, without any change in their character.

The preoperculum has its upper limb slightly inclined forwards, and is greatly rounded off at the corner, the curve extending to the whole under limb, which is shorter than the upper one. A very shallow notch at the corner is filled with membrane, the upper limb is minutely serrated, and the lower one finely gnawed, or irregularly crenated. Fine streaks appear obscurely among the scales which end irregularly close to the edge of the bone.\*

The interoperculum is entire on the edge, and covered on the surface with scales larger than those of the cheek. Near its articulation with the lower jaw it is edged by a slip of membrane, on which the scales are much smaller. At its junction with the suboperculum, opposite to the notch of the preoperculum, and in the usual site of the knob of *Diacope*, it swells up slightly. The under edge of the suboperculum is curved like a reversed italic *f*, which produces a lobe anteriorly, that is wider than the interoperculum, and has its margin finely streaked or plaited. This bone has precisely the same shape in *Glaucosoma birgeri*. The bony operculum ends in two flat, thin, obtuse, striated tips, which are almost lost among the scales, and are separated by a deep angular notch. This notch is concealed by scales, and the membrane which edges the bone is covered with small scales, the posterior edge of the gill-cover being very obtuse. Above the upper angle of the gill-opening the scapular bone exists with a free,

forwards, as in some species of *Percolabrax* or *Plectropoma*, and its spinous dorsal is boldly arched, forming a deep notch at the origin of the jointed part, so that it might with more propriety be ranged with *Percæ* or *Percolabrax* than left in *Centropomistæ*. *Aulocorophus* is a Japanese form which also would technically fall into *Centropomistæ*, but which Messrs. Temminck and Schlegel have kept separate on account of its dissimilar aspect. It has a strong resemblance to *Serranus* or *Plectropoma*.

\* This bone makes no approach in form to that of *Lobotes*, in which the preoperculum has an angular, serrated, projecting corner.



*ceus* it is said "L'opercule est étroit, et il y a quelques écailles sur sa surface, tandis que le sous-opercule et l'interopercule en sont tout-à-fait dépourvus;" (*Hist. des Poiss.* iii. p. 52). If the specimens were uninjured, this seems to be a sufficient distinctive character, but there does not exist an equally strong reason for considering *salar* as specifically distinct from Forster's *trutta*, though the figures are not sufficiently detailed to prove their identity. I consider it, therefore, safer to retain the name of *salar*, until the ichthyology of South Australia and New Zealand has been more fully investigated, especially as the authority of the *Histoire des Poissons* has consecrated a very similar appellation to *trutta*, to a distinct species. Of G. Forster's figures, the one numbered 211 in the volume, and marked *Sciara trutta* ♀, closely resembles *salar* in form, and in the spots of the back forming transverse bars. Number 210, which, like the preceding, is an unfinished pencil sketch, was executed from a specimen taken in Queen Charlotte's Sound on the 7th of November, 1774, and represents a more slender fish than our *salar*, with the spots above the lateral line less uniformly round, and not disposed in transverse rows. It shows also a longer soft dorsal, with its last ray and that of the anal more abruptly produced; the latter fin also is longer and more even. Parkinson's figure, number 67, executed at Opooragee, in New Zealand, and 68, drawn in Queen Charlotte's Sound, seem to have been taken from fishes precisely similar in form to Forster's fig. 210, and therefore, it may be concluded, of the same species, but differing in the characters above-mentioned, from his 211. The names inscribed on Parkinson's drawings are *Multoides sapidissimus*, and *Sciara multoides*, bestowed upon them by Solander, whose notes on the species are referred to and partly quoted in the Zoological Transactions (iii. p. 79). Our figure of *salar*, which is very correct, will enable ichthyologists who may have an opportunity of examining good collections of Australian fish, to clear up the obscurity in which these species are still involved.

We have elsewhere (p. 27) noticed the somewhat incongruous assemblage of species in the *Histoire des Poissons*, under the generic appellation of *Centropristes*; and the authors of that work, as we have said above, mention the Mæonid aspect of *truttaceus*, as an indication of its being the type of a distinct genus. Solander terms it, or a very similar species, *Multoides*, and Forster says that *trutta* has many claims to rank with the *Mugiles*, but taking the whole of its characters into consideration, he was induced to place it in the genus *Sciara*, which, in his time, was more comprehensive than it is now. The *Centropristes georgianus*, which bears a close affinity to *salar*, has been chosen by the Rev. Leonard Jenyns as the type of his genus *Arripis*, so named because the scales of the body are destitute of the usual fan-shaped furrows on their covered bases. In *salar* the scales show distinct though not strong traces of these furrows, as may be observed in the magnified figure of a lateral scale (Plate XX. fig. 6), but we have, nevertheless, thought it right to place it in the same group with *georgianus*, employing the word *Arripis* for the present, merely as the name of a subgenus, from not being able to determine satisfactorily the part of the system to which the group ought to be referred.

The form of *Centropristes salar* is described in the Zoological Transactions as quoted above, and our figures supply ample means of comparison with other species. All our specimens have a space before and behind the eye covered with a thick mucous deposit, resembling, in that respect, certain states of the common mackerel, and the disk of the preoperculum is also veined in a manner not very dissimilar to the same part in that fish. The specimens vary from six inches to a foot in length.

HAB. Bay of Islands, New Zealand (Sir James Ross); Port Arthur, Van Diemen's Land (F. J. Lempriere, Esq.); Queen Charlotte's Sound and Norfolk Island (J. R. Forster).

#### ELEGINUS FALKLANDICUS. Richardson.

CH. SPEC. *El. preoperculo sub-angulato, pinnâ caudæ margine concavâ.*

RADI: —Br. 6; D. 7—125; A. 123; C. 15½; P. 23; V. 15.

Plate XX., figs. 1, 2, natural size; fig. 3 magnified.

This *Eleginus* is the object of a considerable fishery at the Falkland Islands, whence it is exported, after being cured, to South America. In the forward position of the ventrals and the pores on the jaw and head, this fish is analogous to *Notothenia*, but its dentition is dissimilar, and its lateral line continuuous. The characters by which the genus is discriminated from the other *Sciænidæ*, with which it is ranged in the *Histoire des Poissons*, are there stated to be,—the entire preoperculum, small mouth, long anal, very large pectorals, and jugular ventrals. Our fish has these characters, and indeed answers pretty closely to the whole description of *Eleginus maclovinus*, in the work alluded to, but it differs from that and the other two described species, in having fewer spines in the first dorsal. I have had no opportunity of examining specimens of the known species, but the plate of *E. maclovinus* in the *Voyage de la Coquille* (No. 17), fails entirely in giving the generic aspect, and is manifestly inaccurate in the lateral line, and in other particulars. The figure of the same species, in the *Histoire des Poissons* (l. 115), gives the general aspect with more success, but differs from *falklandicus* in the distribution of the scales on the lower limb of the preoperculum, in the form of the pectoral, which does not coincide with the description in the text, in the first three rays of each of the vertical fins not being approximated to the other, and in the want of pores on the head. We have no means of judging whether these discrepancies be specific, or merely omissions arising from inattention in the artist.

Form compressed, fusiform, snout gibbous, head small. Eye rather small. Posterior nasal opening placed nearer to the end of the snout than to the eye. Anterior opening very minute, and considerably before the hinder one. Jaws moderately protractile. Maxillary small, and capable of being all retracted under the preorbitar, except the lower corner. Mouth cleft about half way to the eye. Teeth short, slender, rather obtuse, and erect, forming narrow, not crowded villiform plates on the jaws. Tongue and roof of the mouth smooth. Preorbitar and snout

scaleless, as are also the corner of the cheek next the mouth, the lower limb of the preoperculum, the interoperculum, fore part of the suboperculum, and all the jaws. The scales on the top of the head are small, and run forward to the posterior nostrils. The scaly cheek is level with the upper limb of the preoperculum, and the scales become minute inferiorly, and terminate very unevenly. The limbs of the preoperculum are entire. The operculum ends in an obtuse flat point, beyond which the membranous lobe of the interoperculum extends. A wide shallow notch slopes forwards above the opercular point, having its anterior corner also rounded. The form of the entire gill-cover is triangular, with a bluntness tip. The gill-membranes are united beneath, and are supported by six rays on each side.

The scales of the body *in situ* show concentric folds of cuticle, and have strongly toothed edges. The lateral line is traced in the upper third of the height, and is nearly straight, or very slightly arched. It is formed by a simple tube on each scale, which, when the specimen is removed from the spirits, speedily shrinks into a narrow furrow. There are fifty-eight scales in the lateral line. A line of similar tubes or furrows is continued forwards from the lateral line along the temples to the eye, and there are, as in *Mugil macrolepidotus*, eight tuberculous scales on the cranium, whose arrangement is shown in fig. 2, Plate XX. A series of pores also exists along each limb of the lower jaw, and round the edges of the preopercula. Small scales are densely tiled on the lower half of the caudal, and on one-third of the pectoral. A clear streak coincides with each row of scales on the body, as in the mullets.

The ventrals are attached under the middle of the suboperculum, before the pectorals. The form of the pectoral is triangular, the fifth and sixth rays being the longest, and the superior ones closely incumbent. The tip of the fin, when turned back, reaches to the eighth dorsal ray, or sixth anal one. The caudal is slightly crescentic at the end.

The specimens in the collection are numerous, and vary in length from five to fourteen inches.

HAB. The Falkland Islands.

#### PLOTOSUS MICROCEPS. Richardson.

CH. SPEC. *Pl. pallide guttatae marmoratæque, macula oblonga supra pinnam pectoralem; capite octavam partem longitudinis totius æquant.*

RADI:—D. 1½—92; A. 86; C. 8; (= 186); P. 1½; V. 9.

Plate XXI., figs. 4, 5, natural size; figs. 6, 7, magnified.

This *Plotosus*, for which we are indebted to the industry of Mr. Bynoe, is remarkable for the smallness of its head, which does not exceed the eighth part of the entire length of the fish. The breadth of the head is superior to its height at the nape, and about one quarter shorter than its length to the gill-opening. The body is highest near the middle of its length, and there its thickness is only half its height. The tapering from thence to the acute point of the tail is gradual. The mouth is of moderate size, the lips thickish and granulated, especially the lower one,

where the soft grains are in distinct rows, two in the middle and three or four laterally. The teeth on the jaws are conical, with the tips truncated, and stand in three rows, of which the outer row is tallest. There is a narrow toothless space at the symphysis of the lower jaw, but in the upper one the dental plates are contiguous. The vela are very narrow, delicate, and waved or crenated on the edge. The teeth on the vomer are in five or six rows, more worn generally than those on the jaws, and the middle ones are the highest.

The barbels are in four pairs, the nasal ones being the longest, and reaching beyond the middle of the pectorals. The maxillary barbels next in length reach to the gill-opening. The barbels of the lower jaw are shorter, particularly the interior pair. The posterior nostril on the base of the barbel could alone be made out, the anterior one being imperceptible.

The top of the head is studded with pores, whose tumid lips form little round, soft grains. The lateral line is straight and fine, but very conspicuous, and is formed of a chain of small pores or tubes raised above the surface. There is no perforation in the integuments of the axilla of the pectoral. The specimen has the genital papilla and canthiower-like appendage usual in the genus.

The rays of the fins are enveloped in thick membrane, and were reckoned with difficulty. The spines of the pectoral and first dorsal are shorter than the soft rays, and are serrated, the pectoral spine on one side only, the dorsal one on both. They are enveloped in skin, but pierce it when handled (figs. 6, 7). The first dorsal is tall, and tapers to a filamentous point.

In spirits the specimen has a light brownish or yellowish-grey tint, thickly mottled, fins included, with round spots and indefinite blotches of pale lead-grey. There is an oblong mark on the side above the pectoral.

The liver of our specimen had perished, but the recesses on each side of the first vertebra for the reception of its upper lobes exist. The peritoneum has a silvery lustre. The gut, small for the size of the fish, is gathered in folds round the margin of the mesentery, and becomes gradually of less caliber from the œsophagus to near the anus. Its upper end was blackish, having been probably stained by the food. A small quantity of very soft well-digested matter was contained in the intestinal canal.

#### DIMENSIONS.

Length of the specimen .....	9.20 inches.
" from snout to anus .....	2.50 "

HAB. North-west coast of Australia.

#### PLOTOSUS MEGASTOMUS. Richardson.

CH. SPEC. *Pl. fuscus, obscure parietæque guttatus; capite quartam partem longitudinis totius efficiente, ore laxo, cirrhis decem.*

RADI:—B. 11; D. 1¼—82; C. 16; A. 76. (= 174); P. 1½; V. 11.

Plate XXI., figs. 1, 2, 3, half the natural size.

The difference of aspect between this fish and other *Plotosi* arises chiefly from the length of the head, and the large-



ness of the orifice of the mouth. The upper lip has an additional barbel, and the lower one is greatly developed. The collection contains but one specimen, which was procured at Sidney, the most southern locality that has been named for a Siluroid fish. This individual appears to have been injured on the end of the tail during life, as the last vertebrae are ankylosed, uneven and not symmetrical. The ordinary form of the tail may, therefore, be different from our figure, and most probably more pointed.

The proportionally large head constitutes a fourth part of the total length of the fish. Its breadth is one quarter less, and does not quite equal twice its height. It is flat above, with a wide snout, and its profile does not descend much below the level of the back. The eyes are rather nearer to the end of the snout than to the gill-opening, and the distance between them is nearly equal to that between the orbits and posterior nostrils. The mouth is very wide, the gape being enlarged at the sides by a fold of thick dilatable skin. The under lip is broad, has a free posterior four-lobed edge between the interior submaxillary barbels, and is studded on its inner surface by rows of minute, soft, brown, fringed eminences. The upper lip is minutely crenated on the edge, and there is a row of the same brown papillae round the front of the roof of the mouth, before the vomerine teeth. These are probably organs of touch, as they are too small to be of service in retaining the food.

The somewhat conical but obtuse intermaxillary teeth are disposed in two small patches, not very precise in outline, being oval on one side of the symphysis and quadrangular on the other. The patches of teeth on the lower jaw are much larger, and of a triangular form, and the teeth of the outer row only have the form of the upper ones, the rest being closely set, flat and round, in fact pavement-like. The vomerine teeth are wholly of this pavement form, and constitute a pretty large heart-shaped patch, with the apex in front. The much smaller, cylindrical, and blunt pharyngeal teeth stand in three rows above and below, presenting a narrow dental surface. The interior rakers are subulate, but with obtuse tips, and the others are soft crenated ridges lying across the arches.

The nasal barbel reaches just past the eye. One nostril is pierced close behind its base, the other is some way before it on the extreme edge of the lip. The maxillary barbel is slightly shorter, and beneath it is a still shorter one, springing from near the corner of the mouth, above the pale, pendant fold of the lip; making, with the four submaxillary barbels, ten in all.

The integuments of the head, body and fins are soft, smooth, and lax. A cluster of pores exists on the top of the head posteriorly; there is another on each supra-scapular region, and a few solitary pores may be detected elsewhere. The lateral line is extremely indistinct. A round hole, opening through the integuments and fascia, exists in the upper angle of the axilla of each pectoral fin. It leads to a sac of some size, spreading towards the interparietal bone, the hollow of the humeral chain, and also posteriorly; but there appears to be no communication with the gills, or any interior cavity, such as exists in some other Siluroids. The conical genital papilla overtops the cauliflower-looking appendage behind it. The

latter rises by a slender stem, forming a deep pit, and spreads out, dividing midway into many blunt processes, which give it the cauliflower form. A small frenum runs from the base of the genital papilla to the root of the appendage, and a minute pore was observed on the posterior surface of the papilla, but I could not detect the orifice in front.

The first dorsal is less lofty and tapering than in the other species, and is connected to the second by a loose fold of skin. Its spine, and that of the pectoral fin, are serrated, as usual, but they are enveloped and completely concealed by thick integument.

The fish, as preserved in spirits, has a dark brown colour, with very faint, indications of small spots on the body and fins.

On opening the belly, two lobes only of the liver are seen at the upper part of the cavity, with the fundus of a large gall-bladder projecting from beneath an undulation of the right lobe, which may be considered as a *lobulus Spigelii*. On moving the intestine, however, a long narrow process of the right lobe is discovered running down the side of the cavity nearly to the pelvis. When the liver is raised, two large lobes are withdrawn through an oval opening, from a cavity on each side of the large first vertebra. This cavity is lined by a process of the peritoneum, and the sides of the opening leading to it are strengthened by an almost tendinous thickening of the peritoneum. The septum or diaphragm, which separates the thorax from the belly, is unusually strong, with a shining tendinous lustre. The liver is attached to it by a coronary membrane, which is pierced in the centre by a large vessel, leading to the heart. Besides the four principal lobes, which form, as it were, the corners of the liver, there is a smaller lobe on its under surface, above its middle, and there are several small projections from the circumference of the viscus. The left lower lobe is tapering, pointed, but is not so long as the right one. The liver is wholly dotted by minute black points. The gall-bladder is more than an inch and a half long in our specimen.

The intestinal canal runs from the oesophagus to the anus, without much change of caliber, and without caeca, or stomachal dilatation. On entering the cavity of the belly, the gut is rather on the left side of the spine, but it crosses over to the right directly, and in its course to the vent being thickly puckered on the margin of a strong mesentery. The lower half of the gut is regularly speckled on its peritoneal surface with minute black dots, and within an inch and a half of the anus the coats of the gut are thickened, and it acquires a dark colour internally.

When the intestines are removed, two long, narrow, undivided bodies (*testes*) are seen lying along the spine in the peritoneum, and between them, near the anus, is the urinary bladder. The peritoneum seemed to cover a cavity in our specimen, and on raising it, much brown decayed matter was observed, the remains evidently of the broken down kidneys, mixed with fragments of a very thick glistening membrane, resembling patches of asbestos. This must have been the broken capsule of the air-bladder. The air-bladder itself was entire, but collapsed, and being examined under water, was found to be composed of four large lobes, two of which lay in the hollows of the first



vertebra, and the other two projected downwards nearly half way to the anus. The cavities for lodging the upper lobes were separated from those which contained the upper portions of the liver by the peritoneum, and were lined by pieces of the thick capsule, showing that this invested all the four sections of the air-bladder. The sides of the large first vertebra are concave, with an acute dividing line facing ventrad.

No information was furnished to us as to the habits of the fish, or how it was captured. A small quantity of fragments of minute *Pinus* and *Crustacea* was contained in the gut, about two inches from the œsophagus.

#### DIMENSIONS.

Length of the specimen, nearly .....	20.00 inches.
" from snout to vent .....	8.20   "
" from vent to end of tail .....	11.60   "

HAB. Sidney Cove; Australia.

#### BAGRUS VENATICUS. Richardson.

The north-west coasts of Australia nourish two species of *Bagrus*, a single example of each having been procured there by Benjamin Bynoe, Esq., surgeon of the Beagle. Both specimens are much injured by the spoiling of the spirits in which they were immersed, and most of the barbels have perished, but many of their characters can still be made out. They belong to the same group with *B. bilineatus*, in which the nasal barbel is replaced by a small lid. In general form they approach the *gogora* of Buchanan-Hamilton pretty closely, but the upper lip is not so prominent as in his figure, and the caudal is more deeply forked. The rays of the anal fin are more numerous than in any species of the group described in the *Histoire des Poissons*.

The larger specimen is  $8\frac{1}{2}$  inches long, and for the sake of reference, it is named *venaticus*, in allusion to the Beagle, though we cannot, from its condition, give a correct description of it. Its casque is strongly granulated, and has the form of that of *gogora*, except that the apex of the interparietal process, where it meets the small crescentic buckler of the dorsal fin, is slightly rounded. The width of the base of this process is nearly equal to its length. The granulations of the casque extend forwards to the middle of the orbit, and the mesial membranous space is very narrow and tapering behind, having its greatest breadth exactly between the eyes. The lateral process of the supra-scapular is broad at the base and triangular, and is covered with a granular skin, but no granulations of the bone show through the integument. The lateral line is distinctly marked from the apex of this space to the tail. The triangular plate of the humeral chain, which furnishes a socket for the head of the pectoral spine, is roughly and deeply sculptured, and its posterior corner is acute and pungent. A part of the operculum at its articular angle is marked by radiating rough lines, but the preoperculum and interoperculum are smooth.

The two-edged acute dorsal spine is in height equal to the length of the granulated casque, including its interparietal process, and is granulated in front from the base to its middle, and acutely serrated from thence to the tip. It is a little undulated posteriorly, near the tip. The pec-

toral spine is equal in length to the dorsal one, and is strongly serrated on both sides, from the tip downwards, the serratures ceasing posteriorly about one-third of the length from the base, and giving place to granulations near the base anteriorly. The jointed rays of the fins are considerably injured, and cannot be correctly made out, but the numbers, as nearly as can be ascertained, are as follows:—

RADII:—D. 1/9, or more; — 0; A. about 30; C.  $17\frac{1}{2}$ ; P. 1/13; V. about 8.

The upper lobe of the caudal is rather the longest.

The teeth are short, villiform. The front of the vomer supports two small roundish dental plates, which adhere to each other. The palatine plates are both broader and longer.

The points of the ribs show through the skin, as in *bilineatus*, and the allied species.

The colours are dark greyish-blue on the back, and white on the belly,—the tints of the fins are totally lost.

HAB. N. W. coast of Australia.

#### BAGRUS VERTAGUS. Richardson.

RADII:—B. 6; D. 1/6 vel 7—0; A. 28; P. 1/9; V. 9?

This fish was discovered by the officers of the same ship who found the preceding one, and its specific name has a similar origin. The only specimen we have received was unfortunately too much injured to admit of a correct figure being drawn, and the description must likewise be considered as imperfect. It belongs to the same group of *Bagri* with *venaticus*.

The dorsal spine is proportionally shorter than that of the species just named, being merely equal in length to the space between its base and the orbit, or to the casque, excluding the interparietal process. The pectoral spine is strongly serrated on both sides, and exceeds the dorsal one in length. The adipose fin is rather larger than that of *B. gogora*, and is nearly of the same shape, but its fore edge is a little waved, at the spot where it sinks to the level of the back. The tail is deeply forked.

The casque, less granulated than that of *B. venaticus*, has the same general form. It is shallowly sculptured, as far forward as the orbits, in a pattern similar to what is named rustic work by builders. The apex of the interparietal process is crescentic, and thus fits more exactly to the curve of the buckler than that of *venaticus*. The subulate process of the supra-scapular is clothed with smooth integument. The surface of the humeral chain above the pectoral is more smooth, and not so distinctly seen as that of *venaticus*, nor is its angle so pungent.

The vomerine teeth are disposed in two small separate plates, and the palatine teeth form a still smaller plate near each corner of the mouth. The barbels are six in number, but they were too much injured in the specimen to admit of their length being ascertained.

The tints of the specimen, as far as its state permits us to judge, are sky-blue on the back, with silvery sides and belly. No spots now exist.

Length, three inches.

HAB. North-west coast of Australia.

## HISTIOPTERUS RECURVIROSTRIS. Richardson.

## Plate XXII., figs. 5, 6.

Of this fish I have received merely a mutilated head from Dr. W. P. Jones, Surgeon in the Royal Navy, to whom it was presented by Mr. Moriarty, of Hobart Town. The subopercula, interopercula, and most of the opercula have been broken away, but the parts which remain agree so perfectly with the corresponding parts of *Histiopertus typus*, figured in the forty-fifth plate of the *Fauna Japonica*, that I have no hesitation in assigning it to that genus. It is a very distinct species from *typus*, having a much more elongated and concave muzzle. In *typus*, the profile ascends from the upper lip to the gibbous orbital plate of the frontal bone, at an angle of  $45^\circ$ , and the proportionally smaller eye is directly over the lower limb of the preoperculum, the posterior limb of that bone being vertical, whereas in *recurvirostris* it slopes greatly forwards in descending from the temple. The relative position of the nostrils is the same in both, as are also the bony plates and intermediate cuticular, or scaly spaces, but in *typus* the granulations of the plates run in coarse, radiating, concentric, or parallel ridges, while in *recurvirostris*, the rough points preserve no determinate order, except on the preoperculum, where they are obscurely radiate, and on the operculum, where their course appears to be in parallel lines, but the patterns are very different from those of *typus*. The shagreen of the tip of the chin of the latter is not perceptible in *recurvirostris*. The teeth of our species are coarsely setaceous, in broad, densely-crowded bands, and are easily broken, when each is seen to be traversed by a fine central canal. I received no other information respecting the form of the species, except that it was a very extraordinary fish.

HAB. Coast of Van Diemen's Land; very rare. The specimen was caught in a net in one of the inlets of Storm Bay, by some fishermen, and carried by them to Mr. Moriarty, as a fish which they had never seen before.

## ALEPISAUROS. Lowe.

## Plate XXII., figs. 1, 2, 3, 4.

The Rev. Mr. Lowe, of Madeira, has described and figured a Scomberoid fish, taken on the coasts of that island, under the name of *Alepisaurus ferox*. I have had an opportunity of examining the head of one of his specimens, preserved in the museum of the Philosophical Institution of Cambridge, and have been thereby enabled to assign to the same genus a fragment of a skull, obtained by Dr. Hooker from Mr. Gunn, of Van Diemen's Land, and said to belong to a fish which was taken on the coasts of that colony. It is a distinct species from *ferox*, from which it differs in the more backward position of the eye, the gibbosity of the profile before the orbit, and the generally greater height of the upper jaw.

The bones of the skull are thin, transparent and papery, as is the case in general among the *Scomberidae*. The frontal bone looks almost membranaceous from its delicacy and transparency, but it is strengthened by acute ribs, which radiate from a point over the middle of the orbit,

and near to its edge. The shortest rays proceed directly to the edge of the orbit, the longest run forwards towards the nostrils, while those of medium length go inwards to the mesial line, and backwards to the occiput. The two frontals meet in a straight mesial line on the top of the head, and the space between the orbits is flattish, with a slight declination of the edge of the orbit. The other bones of the head are similarly formed of ribs running through their transparent plates. Slender intermaxillaries form the whole upper border of the mouth, and are armed from end to end with small subulate teeth, which are slightly unequal in height, and do not lie exactly in one line. The palate bones sustain long, thin, lancet-shaped teeth, slightly curved backwards, one pair on each bone standing well forwards near the nostrils, and another pair farther backwards, but before the eye. There is a toothless space between these pairs, and also before the first pair, there being no teeth on the chevron of the vomer. Behind the second pair there are ten shorter lanceolate teeth on each palate bone, increasing a little in size towards the corner of the mouth. The lower jaw is armed with a pair of long lanceolate teeth, fitting to the toothless space between the pairs of the upper jaw, and behind, by twelve short ones. Anteriorly this jaw is furnished with subulate teeth, considerably larger and more widely set than those of the intermaxillaries. A pair of still taller subulate teeth stands close to the symphysis. The long lanceolate teeth have slightly convex lateral surfaces, with a thin border, apparently of more compact bone, which shows a feeble crenature on the edge, when examined through a lens. The surface of the tooth, except the extreme edge, seems to be reticulated. All these teeth are at first recumbent along the jaw, and assume the erect position as the older teeth are broken, and require to be replaced. In figure 2, the two anterior subulate teeth are represented in this position, as they actually existed in the specimen, while in figure 1 they are shown erect, because the adjoining ones were broken. Several lanceolate teeth, both long and short, were also laid along the jaw when the specimen was first examined. The preoperculum is vertical, with a slight curve, and without any horizontal limb. Its fore edge is a strong, ribbed ridge, its disk thin, papery, and radiated, as in the figure. The rest of the opercular bones were broken off. The gill-membrane lies between the limbs of the lower jaw, and contains seven rays.

HAB. Coast of Van Diemen's Land.

## RAIA LEMPRIERI. Richardson.

## Plate XXIII., half the natural size.

This ray has received its specific name in compliment to Deputy Assistant Commissary-General F. J. Lempriere, to whose exertions the Ichthyology of Van Diemen's Land is much indebted. It is nearly allied to the *Raia nasuta*, of which a figure by Parkinson exists in the collection of drawings formed by Sir Joseph Banks, on Cook's first voyage, and now in the British Museum. The most striking difference between them is in the shorter snout of *lemprieri*, forming merely the apex of the rhomboidal anterior half of the disk, and not tapering to a point, as in *nasuta*, whose disk is bounded anteriorly by concave lines.

In this also the lateral caudal spines are nearly as uniformly large as the medial ones, thus forming three rows, which run farther up the back than in *lemprieri*.

Disk rhomboido-ovate: the snout not projecting beyond the angle of the rhomb, but slightly pointed through an undulation in the fore edge of the disk, which rounds off laterally into the ovate posterior half. Its breadth is in proportion to its length, exclusive of the ventrals, as 6 to 5.5. Tail depressed, flat beneath, rounded above, with a faint indication of a blunt mesial ridge, the sides sloping into a thin cuticular edge.

The dorsal fins, of equal size and height, are closely approximated to each other, and to the tip of the tail, the posterior one being joined to the very small caudal by a minute fold of skin. The tip of the tail is acute, and is rendered three-edged by its lateral cuticular margins, and the scarcely more developed caudal fin on its upper surface. This fin is highest in the middle, but even there its height does not equal the breadth of the tip of the tail. The ventrals are folded, and irregularly toothed on the edge by cuticular points corresponding with the rays. A narrow anterior obtuse lobe is separated from the rest of the fin by a notch, which penetrates nearly half way to the base; the margin of the posterior portion is rounded, with a somewhat acute hinder corner. The claspers are fusiform, and are overlapped at the base, together with part of the fore lobe of the ventrals, by the posterior corners of the pectorals.

The tip of the snout, a patch before each eye, part of the cheeks, the anterior borders of the disk, the top of the head, middle line of the back, and upper surface of the tail, with the dorsal fins, are thickly set with fine prickles, which point backwards. The cuticular space between the pectorals and snout, the flanks, the posterior half of pectorals, with the exception of a small patch, the ventrals, and the whole under surface of the fish, are smooth. About seven stronger spines arm the supra-orbital ridge, others are scattered near the anterior edge of the disk, opposite to the eyes, seven or eight occupy the mesial line between the head and humeral cartilage, and a row, beginning at the pelvis, runs down the middle of the tail, having an alternate direction to right and left, not shown in the figure. There are also some scattered larger spines on the sides of the tail among the smaller ones, but no continuous lateral rows, such as appear in the figure of *Raia nasuta*, above referred to. Our specimen exhibits two rows of very acute spines, each enclosed in a sheath and pointing mesiad, situated in the widest part of the disk, a little way from the edge. These are probably peculiar to the male in the spawning season. The nasal flap, as is usual in the genus, is adnate in the middle, with a free rounded lobe at each nostril, set with a short fringe. The nostril is capable of being closed by the expansion of a loose fold from its outer border. Cleft of the mouth moderately arched forwards, and pretty wide. The teeth are round disks, with a central conical cusp, but on the lower jaw many of the cusps are worn away. Both these forms of teeth are shown magnified in the plate.

The tip of the snout above and below, and the point of the tail beneath, are black: the general colour of the upper surface of the fish is blackish-grey; the lateral

regions of the snout and the edges of the pectorals are flesh-coloured, and the under surface is almost wholly white.

Length of specimen, nineteen inches.

HAB. Port Arthur, Van Diemen's Land.

#### UROLOPHUS EPHIPIATUS. Richardson.

Plate XXIV., about two-thirds of the natural size.

Outline of the disk rhomboido-oval, somewhat broader than long, and much like that of *U. aurantiacus*, but less wide, and bounded anteriorly, not by convex lines, but by straight ones, which round broadly off into the oval posterior portion of the disk. The hinder corner of the pectoral is more decided than in *aurantiacus*, being nearly as conspicuous as in the Torpedos. The tip of the snout is an obtuse angle, without the apiculus of *aurantiacus*. Ventrals rounded, united beneath, so that their conjoined margins form a deep curve. Caudal fin oval, both lobes nearly equally high, and the under one scarcely running farther forward than the upper one. About thirty cartilaginous rays shine through the integuments of each lobe. The caudal spine occupies more than two-thirds of the width of the tail at its insertion, tapers to a very acute point, is striated on its anterior surface, and strengthened behind by a rounded keel, which fits a depression in the tail. Its edges are serrated by very acute reverted teeth.

The greatest thickness of the disk is at the junction of the shoulder-girdle with the spine, and from this place the vertical diameter lessens both longitudinally and laterally.

The eyes are of moderate size, and have rather a lateral aspect. Their posterior halves are embraced externally by the spout holes, which exceed the orbits in size, and are widest behind. A small valvular fold projects within the spout-hole from its orbital wall, the rest of its lining is smooth. The united nasal flap has a straight free edge, and is fringed by obtuse cuticular processes, invisible to the naked eye. The base of the flap is slightly narrower than its free border, and its bridle springs from the middle of the upper lip. In the plate the flap is shown in two positions, when hanging down, and when drawn up. A small rounded lobe projects into the nasal opening from its under border. Folds or streaks are disposed in a doubly pectinated order on the lining of the nostrils.

When the mouth is gently open, the dental plates occupy the entire borders of the transverse or slightly arched rictus, the teeth rolling a little farther out in the middle of the lower jaw. Individually the teeth are rhomboidal, with the transverse diameter rather exceeding the longitudinal one, and having a flat or slightly tumid disk, without ridges. Edge of the upper velum straight, and finely fringed, like the nasal flap. Lower velum furnished with three or more soft, smooth, conical papillae, which disappear as the integuments are moved or stretched. Many pores which exist in the disk and tail are shown in their proper positions in the figure.

Genital canal transversely plaited, the tapering cornua of the uterus shaggy, with long, filamentous, crowded villi. Liver large, and when the belly is slit up, nearly concealing the intestines, granular, and divided into two oval lobes by

a fissure penetrating through three-fourths of its depth. The right lobe is the thickest and largest. There are no lobules. The stomach being tender, was torn in the examination, but appears to have been an oblong wide sac, terminating in a narrow intestine, somewhat longer than itself. To this succeeds a valvular colon, which is about as long as the stomach, but rather wider, and lastly, a smooth rectum, a little shorter than the valvular part of the gut.

The specimen, after being kept in spirits, is reddish-brown on the upper surface, with dark lines, disposed somewhat like the harness of a cart-horse, whence the specific name of *ephippiatus*. Their exact form may be ascertained more correctly by turning to the figure, than from any description.

## DIMENSIONS.

Length from snout to tip of tail .....	11.75 inches.
" " base of caudal spine .....	9.25 "
" " crescentic edge of ventrals beneath.....	7.75 "
" " hinder angles of pectorals .....	7.52 "
" " axilla of ditto .....	6.92 "
" " fore point of vent .....	6.55 "
" " posterior gill-opening .....	5.65 "
" " first ditto .....	2.70 "
" " mouth .....	1.68 "
" " middle of nostrils .....	1.28 "
" " centres of spout-holes.....	2.25 "
" " centres of orbits .....	1.90 "
Width of free edge of nasal flap.....	0.75 "
" between anterior pair of gill-openings .....	1.82 "
" between posterior ditto .....	1.19 "
Longitudinal diameter of eyes.....	0.45 "
" " spout-holes .....	0.72 "
Distance between ditto.....	1.10 "
Breadth of disk .....	8.00 "

HAB. Storm Bay, Van Diemen's Land.

## ZEUS AUSTRALIS. Richardson.

RADI:—Br. 7; D. 10.23; A. 4.22; C. 13.4; P. 14; V. 1.5.

Plate XXV., fig. 1.

A single specimen of this fish, in very bad condition, was brought home. The pectoral, ventral and caudal fins are mutilated, and much of the membrane and filaments of the spinous dorsal have disappeared, so that these parts are not to be considered as exactly represented in the figure.

On comparing the specimen carefully with examples of *Zeus faber*, the resemblance of the two species is found to be very great. The Australian fish has, however, proportionally shorter and stouter dorsal spines, the soft part of the fin occupying rather more space. The fourth spine is the tallest, while in *Zeus faber* it is the third. The shields at the bases of the dorsal and anal are more numerous, but much less acutely spinous in *Zeus australis*, which possesses seven shields under the soft dorsal, and eight along the corresponding part of the anal, besides angular points at the root of the spines. The thoracic and abdominal shields are also scarcely spiniferous, while in *faber* the thoracic shields have thin, acute, falcate points, and the ventral ones support acute spines. The supra-scapular spine is nearly obsolete in *australis*, and the coracoid pro-

cess, above the pectoral, as well as the other angular bones about the head, are less acute.

The surfaces of the preoperculum, and of the frontal bones are flat and striated. In *Z. faber* the former of these bones is strengthened by a smooth, elevated, central rib, and the frontal bones show a thin edge on the upper surface of the head, forming keels, which end in a small spine on each side of the occiput. This point is smooth and flat in *australis*.

Length, fourteen inches.

The specimen is too much decayed to possess any remains of colour, and there is no vestige of a lateral spot.

In the third volume of the 'Zoological Journal,' I described a Van Diemen's Land fish under the name of *Capros australis*, from a coloured drawing, executed by a convict in that colony. It is possible that he had the species described above before him, in which case he has omitted the spinous shields, and thrown the dorsal fin too far back. The drawing was rose-coloured, without a lateral spot.

HAB. Port Jackson, Australia.

## CRENIDENS TRIGLYPHUS. Richardson.

CH. SPEC. *Cr. dentibus tricuspidentis; radiis articularibus pinnae dorsi spinas altitudine excedentibus.*

RADI:—Br. 6; D. 15.12; A. 3.12; C. 15.3; P. 16; V. 1.5.

Plate XXV., fig. 2.

This fish has the physiognomy of *Crenidens forskalii*, with the same proportion of height to length, but with a rather less convex profile, and somewhat thinner jaws. The outline of the dorsal fin, and the number of rays of the two species, do not correspond, and there are other differences.

The suborbitar of *Cr. triglyphus* is square, with nearly straight edges, and without the small notch at the head of the maxillary which *forskalii* shows. The scales of the cheek are small, and disappear on the disk of the preoperculum and upper border of the gill-cover; the suboperculum, interoperculum, most of the preoperculum, and lower part of the operculum, are covered with smooth skin, thickly sprinkled with minute black dots. In the figure of *Cr. forskalii*, in the *Histoire des Poissons* (pl. 162 *quater*), the whole operculum, suboperculum, and interoperculum, are covered with pretty large scales. The disk of the preoperculum is smooth, and in both species the edge of this bone is transversely furrowed, producing wide, obtuse crenatures. The operculum of *Cr. triglyphus* ends in a thin, flat, acute point, above which the bone slopes away with a slightly concave curve. In our figure, this bony point is represented rather too much like a spine. A row of pretty large scales crosses the supra-scapular region, as in *forskalii*, but their disks are covered with smaller scales, so that they are rendered inconspicuous.

There are forty-six scales in a row, between the gill-opening and caudal fin, which are generally oblong, with the base truncated, the two sides parallel to each other, and the apex rounded. A meniscoid segment of the tip of the scale is rough with teeth, the outer ones very acute, and ciliating the edge. Behind this there is a small, smooth rectangle,



or square, from which the fan-like furrows, varying in number from fifteen to twenty-two, radiate sharply, and take in the whole basal edge. Fine lines of structure are visible parallel to the lateral edges of the scale, ceasing at the flat disk. The lateral line is composed of scales traversed by a simple tube, and covered by the scales above and below, so that, comparatively, little of their disk is seen. Many small scales are crowded on the shoulder at the commencement of the lateral line, mingling imperceptibly with the small ones on the head. The scales behind the ventrals on the under surface of the belly are longer and narrower. The dorsal and anal fins are embraced at the base by scaly fillets, which Forskal indicates when he says "*fossulâ in dorso*;" the soft parts of these fins are scaly between the rays, half-way up, and there are also scaly fillets at the base of the spinous rays, not at every ray, nor exactly alternately. No scales are shown in the fins of *Cr. forskalii*, in the figure above referred to, nor is mention made of them in the text of the *Histoire des Poissons*, but those of the body are said to be "*minces et lisses*," so that if there be no mistake, they differ widely from those of *Cr. triglyphus*.

The branchiostegous rays are six in number.\* The first five dorsal rays are rather abruptly graduated, the five following ones are all of one length, and the last four are again graduated, but very slightly, the last one being as tall as the fifth one. The first short spine touches the second at its base, but is separated from it by membrane at the tip. The soft part of the fin is higher than the spines, and the last ray is divided to the base. The second and third anal spines are equal to each other, and in some specimens, are as tall as the longest dorsal spines, but in the one from which our figure was taken, they are a little shorter. The basal half of the caudal is scaly. This fin is concave on the edge, especially in the smaller specimens, but in the larger ones, when the fin is stretched out it becomes almost even.

In the *Histoire des Poissons*, the dentition of *Cr. forskalii* is described in the following terms:—

"Il y a deux rangées de dents incisives à chaque mâchoire, l'externe de dix dents, l'interne de vingt. Ces dents sont larges, aplaties, insérées verticalement sur la mâchoire; leur bord est festonné et dentelé par cinq denticules, dont les trois du milieu dépassent de beaucoup les laterales. Derrière ces incisives il y a de petites dents grêues et arrondies sur plusieurs rangs. Les pharyngiennes sont en cardes très-fines."

The outer teeth of *Cr. triglyphus* are arranged nearly as above-mentioned, viz., about twenty-two on each limb of each jaw, and here and there the row is doubled, or even trebled, but not in a regular manner. But the inner teeth, though much shorter than the outer ones, are exactly alike in form, pressed closely within each other in five or six rows, so that only the extreme tips project beyond the gum, and give the appearance of a close villiform surface, which is separated by a furrow from the longer teeth on the edge of the jaw, produced by the forward inclination of the latter. It is evident that, as the longer teeth wear

away, their place is supplied by a row from the posterior ones. Each tooth has three blunt tips. The tongue is soft and granular. The roof of the mouth is toothless.

The specimens, which have been long preserved in spirits, are dark coloured, with faint lines in the direction of the scales.

Length, from five to sixteen inches.

HAB. Port Jackson, Australia.

DAJAUS DIEMENSIS. Richardson.

*Dajaus diemensis*. Rich. Zool. Tr. iii. p. 123.

RADI:—Br. 6; D. 4 $\frac{1}{2}$ —10; A. 3 $\frac{1}{2}$ 12; C. 14 $\frac{1}{2}$ ; P. 15; V. 1 $\frac{1}{2}$ 5.

Plate XXVI., figs. 1, 2.

This mullet is fully described, and the characters which distinguish it from the previously discovered Australian mullets, pointed out in the work above quoted. It was placed in the genus *Dajaus*, on account of its vomerine and palatine teeth, but its mouth does not exactly correspond with that of *Dajaus monticola*, and differs little from that of some true mullets. The greater number of its anal rays distinguishes it readily from the other mullets of the Australian seas. Many of the scales had dropped from the operculum of our specimens, before they formed the subject of the artist's skill, so that their exact size and distribution on that part may not be quite correctly represented; the figure is excellent in other parts.

Length, from ten to fourteen inches.

HAB. Van Diemen's Land and West Australia; King George's Sound; Port Arthur.

LATRIS CILIARIS.

CH. SPEC. *L. capite quintam partem longitudinis piscis totius efficiente; radiis sex inferioribus pinna pectoris indivisis; caudâ emarginatâ lobis inæqualibus.*

RADI:—B. 6; D. 17/39; A. 3/32; C. 13 $\frac{1}{2}$ ; P. 11 et 6; A. 1/5.\*

*Sciana ciliaris*, Deser. An. J. R. Forsteri, curâ H. Licht. p. 138, pars deser.

Icon Ined. Georg. Forst. No. 209 in Bibl. Banks. serv.

Plate XXVI., fig. 6, one-third nat. size, fig. 7, magnified.

In the 'Transactions of the Zoological Society' (vol. iii. p. 106), I gave an account of the characters of *Latris*, which may be considered either as a subdivision of *Cheilodactylus*, or as a proper genus, according to the different views of systematic writers. A detailed account of a striped species, named *Latris hecateia*, accompanied by a correct figure, is there given. This is the "Trumpeter" of Van Diemen's Land, the fish which is most prized in the colony for its edible qualities. Fish of the same genus had been observed on the coast of New Zealand, by the naturalists who accompanied Cook on his first and second voyages. One species was taken in Queen Charlotte's Sound, and named by Solander *Sciana salmonea*, but he left no description of it, and all that remains for its identi-

\* The text of the *Histoire des Poissons* mentions five gill-rays, while the formula, a few lines lower, marks six.

\* The figure represents one dorsal spine too many.



fication is an unfinished pencil sketch by Parkinson, preserved in the Banksian Library. This exhibits only fifteen dorsal spines, and does not agree, in that respect, with any specimen we have seen. Another species, procured in Dusky Bay, was named by J. R. Forster *Sciæna lineata*, and his description of it published in Schneider's Bloch, under the appellation of *Cichla lineata*, and also in the edition of his notes, brought out by Lichtenstein (p. 134). George Forster's sketch of the fish, No. 204, in the Banksian Library, differs so much in outline from *Latris hecateia*, that I have not thought it expedient to refer both to the same species, though no decided character is noticed in the description by which they can be distinguished. A comparison of Dusky Bay and Van Diemen's Land specimens is required to decide the point.

There are two other figures by George Forster, which have a closer bearing on the subject of this article than the preceding ones. One numbered 205\* in the Banksian collection, is a coloured drawing of a fish taken in Dusky Bay, and named by the natives Moghee. This presents very nearly the outline of *Latris hecateia*, but wants the lateral stripes of that species, and also the yellow tail of *Latris lineata*. It is entitled *Latris ciliaris*. The other, also inscribed *Latris ciliaris*, is a pencil sketch of a fish, obtained in Queen Charlotte's Sound on the 25th of October, 1774. A description of *Latris ciliaris* is contained in Lichtenstein's edition of J. R. Forster's notes† (p. 137), and reference is made to a figure by George Forster, but it is not said which of the two is meant, and the exact locality is not noted in this work as it is generally on the drawing, so that we receive no assistance from that consideration,‡ but we may suppose that figure (No. 205) is the one intended, since its dimensions (nine inches in total length), correspond with those given in the text. The rays of the dorsal and anal fins are stated in one paragraph to be, D. 16/43; A. 2/36; and in another to be, D. 16/38; A. 2/32. Such a difference in numbers rarely occurs in the same species, and I think it probable that the description was made at different dates, and of two distinct species. It is with the sketch 209, and the rays enumerated in the last paragraph, as well as in the size, which is stated to be thirty inches, that Sir James Ross's specimen, figured in Plate 26, so nearly corresponds, that I have considered them to belong to one species, to which I have applied Forster's name of *ciliaris*, being unwilling to add to the number of specific names, where it can be avoided. If Forster be supposed to have overlooked the first short and incumbent spine of the dorsal and anal spines, there is no material discrepancy between the rays of our specimen and those enumerated in his concluding paragraph. As to George Forster's figures, no great endeavour at accuracy of numbers has been made, if we may judge by comparing them with his father's descriptions, but they render

the generic aspect of the fish, for the most part, very happily.

One sentence in J. R. Forster's notes occasioned me some difficulty, "*Tubercula bina supra oculos, ciliaria*," but I now think that this merely refers to the convexity of the anterior frontal producing an obtuse superciliary ridge. The figures show no other protuberance, although from the conical supra-orbital projections of the frontal bone, observed in some *Cheilodactylus*, we might be led to look for something similar in the allied group of *Latris*.

Sir James Ross's specimen, measuring thirty inches in length, was procured at Sidney, and being put into brine, which spoiled during the voyage, reached this country in very bad condition. On this account our figure cannot pretend to perfect accuracy of outline or markings, but in other respects it may be relied upon.

The head forms a fifth of the whole length to the tip of the lower lobe of the caudal-fin, and its height at the nape is one-sixth less than its length. The eye is high up, and midway between the tip of the snout and apex of the gill-flap. The convex space between the two eyes is less than two diameters of the orbit. The anterior frontal is convex and bulging. The maxillaries are moderately protractile, their pedicels exceeding their dental limbs in length. The limbs of the lower jaw are unusually broad and short, the jaw being articulated opposite to the fore edge of the rectangular preorbital. The under lip folds broadly back laterally. The teeth, small, short, and slenderly subulate, are loosely set on both jaws, to the depth of five or six at the symphysis, diminishing to a single one at the corners of the mouth. Their tips are black in the specimen. There are none on the roof of the mouth.

The preoperculum has a wide smooth disk, and its outer edge is curved parabolically. The upper limb, which is slightly concave, is finely serrated, the teeth becoming obsolete on the rounded corner. The operculum is large, and permits only a narrow suboperculum to appear beneath it. The disk of the interoperculum is comparatively broad. All these bones have entire edges. An occipital crest runs back on the nape, rendering it acute. The distance from its ridge to the upper edge of the gill-cover, exceeds a third of the height of the head. The belly is said to be keeled in Forster's notes. We cannot make out its true form from the specimen, but in *Latris lineata* the sides are compressed, and the belly acute behind the ventrals, yet there is a flatness under surface before these fins, and it is probable that *ciliaris* resembles it in these respects.

The scales are arranged much as in the *Sciænidae*. Those which compose the lateral line are traversed by a simple slender tube, and are notched at the tip. They are smaller than the others, and being overlapped by the adjoining scales both above and below, very little of their disk is seen. They amount to about eighty-four in number, and diminish considerably in size towards the base of the caudal fin. There are twenty-four or twenty-five scales in a vertical row over the ventrals. The scaly filets along the bases of the dorsal and anal fins exist, as is usual in the genus. The first dorsal spine is incumbent on the lower half of the second one, and when invested with soft integument, they would naturally be reckoned only as a single spine, as Forster seems to have done. The two

\* In the comments I made on this figure in the 'Zoological Transactions,' iii. p. 115, the number of it is erroneously printed 204 instead of 205.

† *Anthias ciliaris*, Schu. Bl. p.

‡ In Lichtenstein's work, the pages containing *Sciæna ciliaris* and *lineata* are headed *Nova Hollandia*, though in the text the species are said to inhabit the sea of *Nova Zelandia*.

posterior articulated rays of this fin are approximated, and might also be enumerated as one. The first anal spine is so minute, that it can scarcely be found without dissection. The second one is also very short, but it is thicker, and obtuse. The third one scarcely exceeds a third of the height of the succeeding articulated ray, and is slender and tapering. The last anal ray is divided to the base, and might be reckoned as two. The ventrals are placed under the fifth and sixth dorsal spines, and the posterior third of the pectorals. The lobes of the caudal are unequal, the lower one being largest. This form of the caudal is very general with the *Cheilodactyli* and *Latres*.

HAB. Sidney Cove, Australia.

#### MYCTOPHUM BOOPS. Richardson.

CH. SPEC. *Myct. altitudine corporis vel longitudine capitis quintam partem longitudinis piscis totius equante; oculo magno spatium interoculare excedenti; apparatu lucido, carinato fronte valde conspicuo; pinna dorsalis supra ventrales antepositas incipienti; pinnis pectoris annis attingentibus.*

RADI:—D. 14—0; A. 20; C.  $17\frac{1}{2}$ ; P. 15; V. 8.

Plate XXVII., figs. 6—12.

Many Mediterranean fish of the natural family of *Salmonide*, and heretofore comprised in the genus *Scopelus*, have been investigated by Dr. Cotto, of Messina, and distributed into various new genera. The Prince of Musignano, in the *Fauna Italica*, has pursued the investigation still farther, added another genus, and given figures and descriptions of the several species, grouping the whole into the subfamily of *Scopolina*. Fish of the same family exist abundantly in the ocean, and the specimens brought home by Sir James Ross enable us to describe and figure a few of the species. If sought for, many more might, doubtless, be added to the list, but they ought to be fished for with a gauze net, and in the night time, when they come to the surface in search of the small Crustacea on which they feed. They are brilliant objects, their large scales being resplendent with prismatic colours, and they are, moreover, studded with rows of pearly points, situated in the integument beneath the scales, but shining through them. Great care should be taken in their preservation, as, owing to their scales being very deciduous, they are injured by the slightest friction.

The first species we have to notice belongs to the genus *Myctophum* of Cocco, and Dr. Hooker's sketch, No. 89, presents a figure of it, drawn from the recent fish, captured on the 19th of January. Unfortunately, the notes made at the time have been mislaid. Examples of the same species were collected by Sir Edward Belcher, in the China seas, but no note was taken of the exact place of their capture.

The genus *Myctophum* was first established by Rafinesque, but he assigned to it erroneous characters. Cocco sums up its generic marks as consisting of "the minute clustered or bundled teeth,\* a claviform body, covered by

large scales, among which those of the lateral line are conspicuous, the mouth cleft to oppose the hinder edge of the orbit, the first dorsal opposed to the ventrals, and a shining apparatus on the forehead, between the eyes." To these the Prince of Musignano adds—"Very oblique opercular pieces, short pectoral fins, and bluff snouts." The Oceanic species which we have to describe, do not exhibit any clustering in the distribution of their teeth, and their pectorals are not uniformly short, as in the Mediterranean *Myctophi*.

*Myctophum boops* received its specific appellation from its large round eye, which fills about half the space between the tip of the snout and edge of the gill-cover, being, however, greatly nearer to the former. The exact extent of the shining frontal apparatus cannot be ascertained from our specimens, which are injured, but there remains a soft yellowish substance, that goes as far back between the eyes as the anterior third of the orbit, and forwards round the nostrils. Thin plates from the frontal and the edge of the narrow preorbitar rise up to sustain it. A fine mesial crest of bone also springs from between the fore parts of the orbits, and runs down to meet the thin edge of the preorbitar, which curves upwards round the nostrils.

Fig. 11, in plate 27, is executed from a sketch of the recent fish, by Dr. Hooker, and shows this glandular body in a more entire state than in our specimens.\* The nostrils are well developed interiorly, exhibiting a turbinate bone, composed of ten or twelve radiating leaves.

The mouth is cleft horizontally backwards, to oppose the posterior border of the orbit, but the dental surface of the intermaxillary reaches still farther. The maxillary dilates gradually to its end, which is obliquely truncated, with the corners slightly rounded; and is strengthened from one end to the other by a smooth ridge. It is covered nearly to its end by the preorbitar, and when the mouth is shut, it reaches almost to the preoperculum. The intermaxillary extends to the extremity of the maxillary, so that the latter forms no part of the margin of the mouth. An even, not crowded, row of fine, short, subulate teeth, crowns the edge of the intermaxillary throughout. They are not clustered, and appear to be so only when one or two are broken off here and there, leaving the others in small groups. These teeth are visible to the naked eye, but on the outside of the row, on both jaws, there is a narrow, convex, dental surface, composed of very short, minute, acute teeth, which can be distinguished only through the aid of a microscope. The chevron of the vomer, and edges of the palate bones, are furnished with teeth, similar to the principal row on the jaws; there is a stripe of minute ones close within them on the palate bones, and the convex disks of these bones are covered with very minute granular teeth. The long, subulate rakers of the outer branchial arch project forward into the mouth, over the base of the very short, triangular tongue, and are covered with minute, acute teeth.

The suborbitar bones are thin, papery, and smooth, the second one, situated directly under the eye, being the

\* In figure 6, the small eminence behind the eye, on the hind head and nape, is added from Dr. Hooker's figure, there being no remains of any glandular matter so far back in the specimens.

\* "Gli sottilissimi denti si dispongono a fascetti."—Bos.

largest. The preoperculum is vertical, curved in the arc of a circle, without any under limb. The interoperculum, triangular and small, lies wholly behind the limb of the preoperculum. The gill-cover is large. The operculum is semi-orbicular, approaching to heart-shaped, and is crossed by a furrow above its middle. The suboperculum is not quite two-thirds less, and forms, as usual, the tip of the gill-plate. Its apex is marked by five minute teeth, with furrows running backward from between them for a short distance. The disk of the gill-plate is covered by large scales, but some appear to have fallen from our specimens.

The head makes one-fourth of the total length of the fish, and the height of the head measures about one-fifth of the same distance. The thickness of the body is equal to about two-thirds of its height anteriorly. The compression augments posteriorly. The back is rounded off, but the dorsal stands on a small ridge. There is a flat space behind the adipose fin, which seems to have been occupied by a soft glandular substance, like that on the forehead. The belly is also obtuse, and a flattish space exists before the ventrals.

The pectoral fins reach to the anus, being larger than those of any Mediterranean *Myctophum* described by the Prince of Musignano. The ventrals are placed midway between the tip of the snout and end of the anal, and the first dorsal commences immediately over them. The adipose fin is fibrous, but does not possess the rudiments of true rays.

The scales composing the lateral line are oval, with a short projection in the middle of one edge, and a simple tube on the disk. The axis of the oval is vertical, and the scales are conspicuous among the others; there are about thirty-five in all, the number between the anus and caudal being exactly twenty-three. The other scales are irregularly orbicular, and more or less oblique, according to their position. Their free edges are entire, and their bases show two or three slight lobes, with a corresponding number of faint diverging furrows.

The body is ornamented with many spots, each of which is composed of a round opal-looking dot, set in a black border, and they shine with much lustre through the scales that cover them. A row, containing five of these spots, crosses the nape from one supra-scapular to the other. There is one solitary spot in the gill-plate, where the operculum overlaps the suboperculum, and another one on the interoperculum. On a level with this last there follows one on the coracoid bone, another on the base of the pectoral, and three more on the flanks behind that fin, the row terminating over the anus. Two spots occur on the scales of the lateral line, beneath the tubes, one of them over the anus, and the other over the middle of the anal fin. Twelve exist on each side of the ventral surface of the fish, beginning at the lower jaw, which has three on each limb, and ending at the anus. There are seventeen or eighteen in a row, which runs along the base of the anal, and a short way beyond it. Also two close to the base of the lower lobe of the caudal on each side. Lastly, there is a single mesial one on the upper surface of the tail, contiguous to the caudal.

Four species are described in the *Fauna Italica*, and

with none of these is this species likely to be confounded. Its pectorals exceed theirs considerably in size. The eye is likewise much larger, and the dorsal more on the summit of the dorsal curve than in *Myctophum punctatum*, while the forehead is much less high and precipitous than the faces of the three others.

Length,  $4\frac{1}{2}$  inches.

HAB. The sea between Australia and New Zealand.

#### MYCTOPHUM CORUSCANS. Richardson.

CH. SPEC. *Myct. valde compressum; longitudine capitis altitudineque corporis equalibus quartam partem longitudinis ad initium pinne caudae aequantibus; oculo modico super medium rictum oris grandiusculum posito; apparatu lucido frontali vix ullo vel ad regiones narium restricto, ibique carinâ ossâ medianâ diviso.*

RADI:—D. 12; A. 20; C.  $17\frac{2}{3}$ ; P. 17; V. 8.

Plate XXVII., figs 1—5 inclusive.

On a drawing of this species, by Dr. Hooker, there is a note, stating that it was taken, at intervals, between St. Helena and the Island of Ascension, in the evening, or during the night; and in the journal of the same observer, I find a record of this, and *Myctophum boops*, having been taken on the 10th of August, 1841, between Australia and New Zealand, in the night time, only when the *Eutomotraca* and other marine *Crustacea* on which they feed come most abundantly to the surface.

The Mediterranean species to which this fish bears the nearest resemblance, is the *Myctophum punctatum*, both in general form, and in the smallness of the shining frontal apparatus. It is a much more compressed fish than the preceding, particularly posteriorly, where it tapers much into the very slender tail. The eye is a little removed from the profile, and is placed rather before the middle of the cleft of the mouth. The interorbital space is convex, without any appearance of the glandular substance, which seems to be confined to the immediate border of each nostril. An elevated acute mesial line separates one nasal prominence from the other. The preoperculum slopes moderately backwards. The ventrals are attached at the commencement of the second third of the length of the fish, caudal excluded. The dorsal commences a little behind them; and the upper surface of the tail, behind the adipose fin, is covered by six convex scales, without the flat surface or glandular apparatus of the preceding species. The posterior rays of the dorsal and anal are divided to the base. There are no spines at the base of the caudal, nor apparently any glandular substance on the upper edge of the tail between the adipose and caudal fins. The scales are undulated, and very irregularly and sparingly toothed on the free edge, and have about three basal furrows. Those which compose the lateral line, being thirty-eight in number, are conspicuous, from their different shape (*vide* figs. 3, 4, 5).

The spots are distributed nearly as in *Myctophum boops*. There are eighteen over the anal, exclusive of the two at the base of the caudal.

Only a single row of minute teeth can be seen on the

edge of the jaws; the exterior granular or short villiform stripe, if it exists, being invisible to the eye, aided by a good lens. The teeth on the chevron of the vomer and edges of the palate bones are more distinct than those on the jaws, and form a broader line, as if there were two or three rows. No granular patches can be discovered on the disk of the palate bone.

Length,  $2\frac{1}{4}$  inches.

HAB. The Southern Atlantic and Australian Oceans.

#### MYCTOPHUM ASPERUM. Richardson.

CH. SPEC. *Myct. compressum, caudā gracili, supernē post pinnam adiposam planā; rictu oris grandiusculo parum ultra oculum magnum fissō; apparatu lucido e naribus in medium spatium interocularem extenso; altitudine corporis quintam partem longitudinis totius æquant; squamis eroso-denticulatis.*

RADI:—D. 14; A. 18; C.  $19\frac{1}{2}$ ; P. 16; V. 8.

Plate XXVII., figs. 13, 14, 15.

Profile very obtuse in front. Shoulders not so much compressed as those of *Myct. coruscans*; their thickness is about half their height, which again is equal to about one-fifth of the total length. The length of the head is greater than the height of the body. The eye is large, and is more than its own diameter removed from the gill-opening, being near the profile of the snout. Its diameter is contained two-and-a-half times in the length of the head. The large gape passes a little beyond the eye, and the preoperculum inclines slightly backwards.

Minute setaceous teeth form an even row on the margin of both jaws, and by the help of a lens, two or three rows of very minute acute teeth may be seen on the convex surface, exterior to the principal row. The same microscopical teeth are seen, but much less distinctly, on the upper jaw. Several rows of setaceous teeth are visible to the naked eye on the chevron of the vomer and edges of the palate bones, and a patch of granular microscopical teeth covers the convex plate of the palate bones.

The shining apparatus reaches from the middle of the orbits forward to round the nostrils. It is supported by thin plates of bone, which rise from the *os frontis*, and by others which form cells in the nasal regions; there is also a low mesial keel between the nostrils.

The ventrals are attached well before the middle of the fish, being midway between the snout and end of the anal fin. The dorsals commence over them.

The lateral line contains thirty-seven or thirty-eight scales, which are slightly toothed on the exterior edge. The other scales are more deeply toothed, the teeth being readily visible to the naked eye, and rendering the fish rough to the touch. (*Vide* figs. 14 and 15).

The opal or pearly dots are distributed as in the two species already mentioned, except that there are only fourteen above the anal fin, exclusive of the usual two on the lower base of the caudal fin.

Length,  $1\frac{3}{4}$  inch.

Hab. ———?

#### MYCTOPHUM HANS. Richardson.

CH. SPEC. *Myct. ore laxissimo; pinnā dorsi post ventrales incipienti; pinnā ani longā; altitudine corporis quintam partem longitudinis totius æquant; caudā gracillimā, elongatā.*

RADI:—D. 14; A. 22; C. 22; P. 15; V. 8.

Plate XXVII., figs. 19, 20, 21.

This species has a gape as wide as *Lampargetus*, and the dorsal placed farther back than is usual in *Myctophum*, with a longer anal. It possesses the common clavate outline, with an obtuse forehead, and very slender tail. The height of the body equals one-fifth of the total length, caudal included. The short dorsal stands between the ventrals and anal, and the top of the tail, behind the minute adipose fin, is flattish, and exhibits a row of bright specks laterally, corresponding to the number of the scales that cover it. The anal fin is proportionally long.

One half of the gape is behind the eye, and the preoperculum has a corresponding inclination backwards. The maxillaries are very slender, with merely a slight oval dilatation at their ends. Teeth on the jaws subulate, slender, and acute; three rows on the lower jaw, and two on the intermaxillaries. There is not much difference in their height, but the row which is on the edge of the jaw appears taller when held up to the light. There is a single row on the edge of the palate bones, like those of the jaw, and two or three irregular rows of granular teeth at its base. None were discovered on the chevron of the vomer.

The scales of the lateral line are narrower, higher, and more numerous than in the other species, being forty-one, and there is only one complete row above them, while in the preceding *Myctophi* there are two. The rest of the scales are roundish, with the base less curved, and crossed by four or five furrows. (Fig. 20, 21.)

I am unable to describe the shining apparatus on the forehead, the jaws having come away while the specimen was in the artist's hands, before I had properly examined them. There seemed to be, however, a small mesial crest between the eyes, and another between the nostrils; and it is probable that the glandular matter was deposited on each side of them. The top of the tail between the adipose fin and caudal is flat, and is covered with a nacreous matter.

There are nineteen bright opal dots over the anal, two, as usual, on the lower base of the caudal, and the others which we observe in the rest of the Oceanic *Myctophi*.

Length, two inches.

I examined the intestines of one of the small specimens, but it was too much decayed for me to ascertain the species. The gullet is narrow, below which a wider cylindrical tube descends, to unite with an ascending pyloric branch of equal size. More than half the length of the stomach lies beneath their junction, in form of a conical sac, which was very dark-coloured, from its contents. The gut, on the contrary, is thin, delicate, transparent, and slightly puckerd, but not convoluted. There are about six pyloric cæca, of unequal lengths. The air-



bladder had broken down, and appeared to be small and nacy. The vertebrae of this species are thirty-nine in number.

HAB. This *Myctophum* was put up along with the others, and was most likely taken in the same parts of the Ocean.

LAMPANCTUS RESPLENDENS. Richardson.

CH. SPEC. *L. pinnâ pectorali longâ; pinnâque dorsi magnâ; ossibus preorbitalibus, mandibularibusque lineis scabris percursis.*

RADI:—B. 6 vel 8; D. 23—0; A. 18; C.  $17\frac{1}{2} + \frac{7}{8}$  spines; P. 13; V. 8.

Plate XXVII., figs. 16, 17, 18.

The Prince of Musignano separated this genus from *Myctophum*, on account of the greater length of the pectorals, and the somewhat pike-like depressed snout, giving the fish altogether a different physiognomy. The species that we have to describe differs considerably from the *Myctophi* in the profile of the head, and in the size of the dorsal, but the pectorals are more like those of that genus than of *Lampantus bonapartii*.

Form more spindle-like, and less clavate, than that of *Myctophum*. Height of body contained five or six times in the total length, while the length of the head is contained only four times. The thickness of the body forwards, and the height of the tail behind the adipose fin, are each about equal to half the height of the shoulder. The profile slopes with a slight convexity up to the dorsal line, which is very moderately arched; and the belly is still more flat.

The rather large eye is placed well forwards near the snout, and the preoperculum, consequently, has a large backward slope. The hinder edge of the preoperculum is parallel to the preopercular, but has a wide, shallow concavity; while the suboperculum, which forms, as usual, the apex of the gill-cover, slopes in the opposite direction, giving to the entire flap a very different form to the nearly vertical convex edge which it exhibits in the *Myctophi*.

The nostrils are rather peculiar, one orifice being a short vertical slit, separated from the orbit by a thin, vertical, cartilaginous crest or valve. The other orifice is a round opening, with slightly elevated edges, and lies continuously and on the inside of the other. An obtuse mesial ridge separates the pairs of nostrils, and behind the ridge, between the eyes, there is a small shallow depression. The skin lining it is entire and granular, but whether any of the glandular substance seen on the foreheads of the *Myctophi* was deposited in this spot, cannot be made out from the specimens, which have been long in spirits. The top of the head is scaly up to this depression, which does not go farther back than the anterior third of the orbit.

The circumference of the nostrils is rough, and the suborbital bones and lower jaw are crossed by parallel rough lines. The cheeks and gill-plates are covered by a few large oblique scales, which are very deciduous, and as

the specimens were all more or less injured, their exact number and disposition could not be ascertained. They are represented in fig. 16, as well as they could be made out from the inspection of six examples. The preorbital and fore part of the operculum and suboperculum are minutely grooved.

The large dorsal extends from before the ventrals to past the middle of the anal. The adipose fin is small. The tail is armed on its upper edge, close to the base of the caudal, by seven short spines, and below by nine, which are distinctly visible to the naked eye. All the fins have been more or less injured on the tips, but the figure is completed from the aggregate of the specimens. The narrow scaly gill-membranes fringe the limbs of the lower jaw, and are supported by six (or perhaps eight) gill-rays.\*

An even band of very short villiform teeth arms both jaws, exterior to the acute edge. The row which crowns the edge is not actually taller than the others, but appears so from its position. A similar band arms the edge of each palate bone, and there is a large oval patch of very minute granular teeth, nearly covering the convex disk of that bone. There are no teeth on the chevron of the vomer. The gills come forward within the limbs of the jaw, close to the chin, leaving no tongue, except the very narrow union of their arches. A prominent mesial ridge, armed with minute teeth, separates these arches below, and it is flanked on each side by slender rough rakers, whose tips project into the cavity of the mouth. The upper pharyngeals make two distinct prominent cushions on each side, bristling with minute, acute teeth. The lower pharyngeals are armed with still finer teeth.

There are thirty-seven scales on the lateral line, all of them fissured or notched in the middle of their free edge, and furnished with a wide tube towards their base. The other scales are suborbicular, and have five or six fan-like furrows on the base, with a few faint lines radiating from the centre, across the rest of their disk.

The pearly dots are distributed nearly as in the *Myctophi*, there being fourteen of them over the anal. There is, besides, a row of oblique, orange-coloured or shining specks, running backwards from the supra-scapulars over the shoulders. The row is interrupted, and recommences higher up, beneath the fourth or fifth dorsal rays, and is continued to the end of that fin. There are similar specks on the small rays at the base of the caudal, above and below, and the flat upper surface of the tail, behind the adipose fin, is covered with the same yellowish matter. There are also a few specks of it on the flanks. These pale or yellowish specks are very distinct from the opal dots, and are more superficial.

The stomach of this fish is a pretty large cylindrical sac, with an obtusely conical apex, and a short, ascending, pyloric branch springing from near its middle. The gullet is more contracted. The pyloric cæca lie in two clusters, one of four, and the other of three, unequal in length, the longest exceeding that of the pyloric fork of the stomach. The stomach is black, like the inside of the mouth,

\* I could only observe six, but it may be that one or two escaped my search.



the gut is white, thin, and delicate, a little flexuose, but not convoluted, and it is twice the length of the stomach.

Length, four inches.

HAB. The exact localities where this fish was taken are unknown; but it is supposed to be, like the *Myctophi*, an inhabitant generally of the warmer parts of both oceans.

# HEMISCYLLIUM TRISPECULARE. Richardson.

## Plate XXVIII.

*Hemiscyllium trispeculare*, Richardson, *Icones Piscium*. Lond. 1843, p. 5, Plate 1, fig. 2.

This species was first made known in the work above quoted, wherein a coloured figure is given from a drawing by Lieutenant Emery, of Her Majesty's ship *Beagle*, of a specimen taken at Turtle Island, on the north-west coast of Australia. A specimen, in perfect condition, obtained by Benjamin Bynoe, Esq., Surgeon of the Royal Navy, on the same coast, has entirely removed the doubts I entertained of this fish being a variety of the previously known species *Hemiscyllium ocellatum*. In general form the two differ little; but in *trispeculare* the pectoral, dorsal and anal are somewhat more distant from the tip of the snout, and more definite discrepancies exist in the shape of the scales, and the form and distribution of the spots on the body.

*H. trispeculare* has an obtuse snout, from whence the profile rises in a convex curve, to blend with the dorsal line opposite to the pectorals. It then descends a little to the first dorsal, and runs straight from thence to the caudal fin, whose upper border is slightly arched. The ventral line is more nearly straight, the belly being only moderately prominent. Between the pectorals and ventrals, where the body is thickest, the vertical and transverse diameters are equal, and measure two inches in our specimen. The belly is wider and flatter than the back, and the fish tapers gradually to the beginning of the anal fin, at which place the height has diminished to one-third. Behind the second dorsal, the compression of the tail becomes evident, and goes on increasing to the tip.

On its upper surface the head is flatly rounded transversely, varied by a slight prominence of the eyebrows. From above the pectorals, to the first dorsal, the muscles, swelling on the top of the back, produce a mesial furrow, which is replaced by a low, rounded ridge between the dorsals, the narrower top of the back there being flattish. The same form extends for a space behind the second dorsal, but in the increased compression of the tail, at the origin of the caudal fin, the flatness above is wholly lost, and the blunt upper edge of the fin appears as a continuation merely of the mesial ridge. The tip of the caudal is rounded, with a minute notch at the point of the spine, dividing it into two lobes, the lower of which is largest. In our specimen of *ocellatum*, this small notch is wanting. The belly is flattish below, and the swelling of the side muscles between the claspers and anal forms a mesial furrow.

The spiracles, which are curved and rather oblique, have the same relative position as in *ocellatum*, and the folds about the nostrils and mouth are also essentially the same

as in that species. The inner nasal flap ends squarely on the edge of the mouth, and is flanked exteriorly by a thickish, tapering barbel, which originates at the anterior end of the nasal furrow. A middle space separates the nasal flap of one nostril from that of the other, and the outer border of each nostril swells into a thick roll, which also reaches the orifice of the mouth, and is there separated by a deep scaleless fissure from the large rolls at the corner of the mouth, or, as they may be considered, the lateral lips. At first sight, the lower lip seems to consist of three lobes, and the side lobes have actually free edges, and are bounded by scaleless membranous fissures, but the middle lobe is merely a pouting of the part continuous with the scaly integument of the throat. The surfaces of all the flaps or lips which have been mentioned are scaly, but the fissures are smooth and membranous, and when the outer lobes of the lower lip are raised, they seem to be retained by a membranous bridle.

The teeth are three-lobed, all the lobes being obtuse in such teeth as have advanced to the edge of the jaw, but the posterior and newer ones have the middle or hinder lobe more elongated and pointed. In the upper jaw, behind the dental plates, there is a thickish, plaited *velum*, having a shaggy surface. In the lower jaw, a central bridle runs to the tip of the tongue, dividing, in its course, two concentric folds of membrane, looking like two *vela*, and, when the tongue is raised, forming two cells on each side of the bridle.

The last three gill-openings are over the pectoral, and the last two are nearer to one another than any other pair, contrary to a remark of Müller and Henle, that in this genus the last two openings are not approximated. We observe the same thing in our specimen of *ocellatum*.

The skin has a peculiarly neat, smooth, shining, though granular aspect, and feels rough only when the finger is drawn towards the head. Figure 7 represents a scale of *trispeculare*, and figure 8, one of *ocellatum*, showing their difference of form.

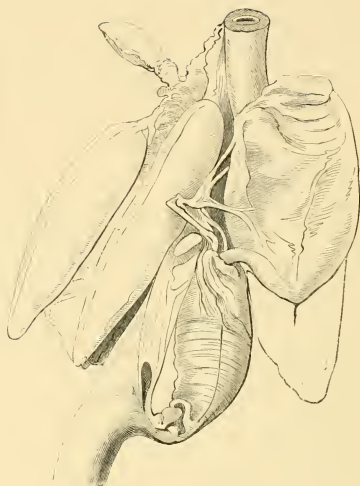
Although there is a general resemblance in the bands and distribution of the black patches on the fins of the two species, the markings on the body differ very greatly. In *trispeculare*, the spots, having a dark and rich brown colour, are in clusters of three or four, united into a larger spot by a lighter brown tint; while in *ocellatum* they are single, fewer, and more scattered. The black spot with a pale border, behind the gill-opening, is oblong in *ocellatum*; but in *trispeculare* it is perfectly round, and two of the compound spots behind it being much darker than the rest, form, as it were, two additional *ocelli*, but not so perfect as the principal one. Much smaller spots thickly cover the top and sides of the head of *trispeculare*, and the ground-colour of the fish is represented in Lieutenant Emery's drawing as yellow. The belly is spotless in both species. As the figure gives the form and distribution of the spots and bands with much accuracy, it is unnecessary to describe them at greater length.

On opening the belly, the liver is seen hiding the intestines. A deep cleft divides it into two lobes, the right one, ending in an acute lanceolate tip, being the longest. The left lobe is broader, and from beneath its obliquely truncated end, the fundus of the stomach appears, having the

Fig. 1.



Fig. 2.



spleen, shaped like the head of an arrow, attached to its bend. These parts are represented in the first woodcut, a little separated, that their form may be better seen. On removing the liver, the intestines come into view, as in the second cut. A thick, dark purple, muscular œsophagus opens into a wide, white, ovate stomach, with a narrow gut passing from the right of its fundus, making a short sigmoid flexure, and entering a wide colon, which is traversed by a spiral valve. An ample rectum completes the canal, and is shown in the cut, suspended by a portion of the mesentery, with a gland close to it. The testes are drawn to the right, that they may be seen, and above them there is a glandular body, composed of large compressed *acini*, which separate from each other when the containing capsule is ruptured. The cuts show the viscera of their proper size, and we have used the terms right and left in reference to their natural position in the fish, with its belly downwards.

## DIMENSIONS.

Length from the end of the snout to the tip of the tail ... 22·50 inches.

33	33	first dorsal .....	8·25	33
33	33	anus .....	6·88	33
33	33	ventrals .....	6·40	33
33	33	last gill-opening..	3·50	33
33	33	first ditto .....	2·50	33
33	33	pectorals .....	2·73	33
33	33	spiracles .....	1·50	33
33	33	eye .....	1·35	33
33	33	mouth .....	0·38	33
Distance between the anus and tail fin .....			11·35	33
Length of claspers along their interior edges .....			2·70	33
33	33	tail fin, two under lobes .....	3·80	33

ACANTHIAS. Müller and Henle.

## Plate XXVIII., fig. 5.

This figure is copied from a drawing of a foetal shark by Dr. Hooker, executed on the Australian coast. Müller and Henle state that the *Acanthias vulgaris* is an inhabitant of the southern seas, and that the young are spotted with white. They say nothing, however, of the black patches on the fins, and we have, therefore, introduced the figure, that it may be compared with equally young examples of that species.

RYNCHANA GREYL. Richardson.

*Species unica adhuc detecta.*

RADI:—Br. 3; D. 3|11; A. 2|7; C. 19½; P. 11; V. 9.

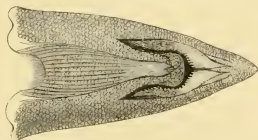
Plate XXIX., figs. 1, 2, 3, 4, 5, 6.

We owe this remarkable Cyprinoid to His Excellency Captain George Grey, Lieutenant-Governor of West Australia, whose exertions in the cause of Zoology have been productive of several important discoveries. One Cyprinoid (*Ptycholepis*) had been previously detected at the northern extremity of Australia, and the existence of another in the south-western corner of that land, now ascertained, is an important fact in the history of the geographical distribution of fish. Further researches will probably show, that the absence, or even rarity of mem-

bers of this family in that district of the world, has been erroneously asserted; and when one reflects that the *Cyprinidae* are numerous in Java, and the adjoining chain of islands, a reasonable hope is naturally excited, of the existence of similar species on the opposite, and not far distant north-western coasts of Australia. A family which is almost wholly located in fresh waters, cannot be very abundant in the small islands of *Polynesia*; but the marine species above alluded to traverses Torres Straits to the island of Tauna. The rivers of the southern parts of Australia, being more like morasses, or strings of ponds of impure water, than healthy streams, are unsuitable for the nourishment of many kinds of fish; but within the tropics, where periodical and abundant rains fall, the rivers, whether small or large, are likely to be of a very different character, and to nourish many kinds of fish. Ichthyology has hitherto been considered as so secondary an object, that few or none of our surveying officers have pursued the search for fish with proper nets, and in a suitable manner; yet, in a new colony especially, a knowledge of the neighbouring fishing-banks is of the first importance, and may be turned to good account.

Sir James Ross's success in the discovery of novel and interesting forms of fish, may be attributed to the constant employment of a towing net, and to his use of a dredge whenever practicable. The stomachs of seals and sea-birds were explored with success by him and Dr. Hooker.

The Cyprinoid we have at present to describe, is quite a new form, and when the figures in Plate 29 were drawn, our only materials were two dried specimens from West Australia; but within a few days we have had, through the kindness of Professor Owen, an opportunity of inspecting a specimen, very perfectly preserved in spirits, sent from New Zealand by Captain Sir Everard Home, of the North Star. We are thereby enabled to give some anatomical particulars, and to amend the description of the lips, which is not quite correctly given in fig. 3, owing to the contraction of the parts in drying. This is remedied by the introduction of a wood-cut, exhibiting the mouth, when closed.\*



The stomach contained some blackish matter, mixed with grains of sand, and between the gills were fragments of a turbinated shell, old and worn, which had been long dead, and evidently taken into the mouth along with the matters on which the fish preyed. The fragments were much too large to pass the oesophagus. This seems to be evidence of the fish finding its food among the sand or mud of the bottom, as indeed its form and position, so similar to the mouths of the sturgeons, would lead us naturally to infer.

\* Even this cut does not exhibit the rostral barbel and the labial papillæ so clearly as I could have wished.

The following is a summary of its most remarkable external characters.

RYNCHANA, i. e. *perygæa*, *nasuta*.

- Forma *elongata*, inter *Cyprinidas* *longissima*.  
Caput *conicum* ubique præter labia *squamosum*.  
Rostrum *ultra oculum productum, conicum, acutum, infra cirrho parvulo, mediano, solitario suppeditalum*.  
Osculum *inferum, ad sugendum aptum, rictu patulo semitrotundo*. Labia *transversim sulcata papillosa ciliata*.  
Labium superius *ad angulum oris lobulatum*. Labium inferum *tri-lobulatum*.  
Dentes pharyngei, *breves, gracilenti, cylindrici, truncati, subpatimentati*.  
Radii branchiostegi tres. Membrana branchiostega *cum gulo coalescens et aperturam solummodo verticalem limitans*.  
Pinna dorsi *brevis, ventrales valdè retropositas opposens: spinis validis nullis*. Pinna ani *in medio inter pinnas dorsi caudæque posita*. Pinnae omnes *inter radios squamosæ. Appendices longè acuminatæ squamosæ supra pinnas pectorales et ventrales protensæ*.  
Squamae *parvæ validè ciliatæ*.  
Linea lateralis *recta, dorso parallela*.  
Cæca pylorica *circiter quinque*. Vesica *pneumatica nulla?*

Form linear, sub-quadrilateral, with the corners much rounded, the tail behind the dorsal tapering, and at the same time becoming compressed, and quite thin at the origin of the caudal. At the base of this fin, above and below, there is a short acute keel. The height anteriorly and the thickness are equal to one another, and to one-twelfth part of the whole length.

The head forms a seventh of the length, is conical, much rounded above and flattish beneath, and on the gill-plates. It tapers gradually to the tip of the acute snout. The eye, oval and rather large, is situated midway between the tip of the snout and the gill-opening, and its axis equals a fourth of the length of the head. It encroaches on the profile, and the space between the orbits exceeds the vertical diameter of the eye. Before the eye, and at a greater distance from it than from the tip of the snout, are the two small and quite contiguous openings of the nostrils, on each side. A small barbel depends from the middle line of the snout beneath, before the nostrils.

Midway between the eye and tip of the snout is the mouth, entirely on the under surface of the head, and opening downwards. Its small orifice, when fully extended, is semi-oval, approaching to a semicircle, the upper lip being vaulted and the lower one transverse. The lips are thick, and softly granular, or papillose, and are ciliated. On the upper lip the soft grains are in rows, and the cirrhi are merely the papillæ in an elongated, tapering form, being longest at the corners of the mouth, where the lip ends in a loose lobe, or lappet. Except at this place, the cirrhi of the upper lip are on its interior edge, and somewhat resemble a row of teeth, as in the genus *Nandina* of Gray, (*Cirrhinus*, McLellan; *Rohita*, Valenciennes). On the lower lip, the cirrhi are a minute fringe to its

posterior or outer edge, and form three small tapering lobes, of which the middle one is the smallest. The granulations of the surface of this lip extend inwards to the cavity of the mouth, without any defined edge of termination. Figure 3, Plate 29, shows the orifice of the mouth too round, the lobes at the corner of the mouth too small, and without fringes, and the lower lip also incorrect in outline. The wood-cut is introduced to remedy these defects, and exhibits the mouth nearly closed. The mouth opens simply by the depression of the lower jaw, bringing forward the lower end of the maxillaries. The intermaxillaries, being slender, straight bones, without pedicles, are incapable of protraction. Their length corresponds to the breadth of the lip, which they cross with some obliquity, and they are articulated to a small bony tubercle, posterior to the nasal barbel. The maxillary descends from near the tip of the snout, concealed by the integuments, to the articulation of the intermaxillary, and there makes a bend, when its slender limb becomes visible, and gradually widens into a flat, yet narrow disk, which reaches the corner of the mouth. Between the rostral barbel and the middle of the upper lip there is a smooth mesial furrow, and on each side of it, inclining towards the corners of the mouth, a short, rounded, scaly ridge. A deep fold runs back from the snout along the under edge of the preorbital and cheek, to the articulation of the lower jaw, under the middle of the orbit. This fold entirely covers the retracted maxillary. It is scaly, as are all the parts on the head, except the lips and the angles of the mouth and lower jaw, which fold inwards when the orifice is shut. Within the upper lip there is a broad thick *velum*; the inside of the mouth is lined with purplish-black smooth membrane; the vomer shows a narrow, smooth surface, running to the end of the snout, and on each side of it is the vaulted palate-bone. The basilar bone joins the vomer evenly, and there is no thick cushion on the upper surface of the fauces, such as may be observed in the Carps, neither does the gorget-shaped basilar process of the *Catostomi* exist, its office being performed by a group of teeth on each side of the mesial line, connected to the basilar bone by the intervention of soft parts. These teeth are short, cylindrical, and truncated or worn on the tips, nineteen in each group above, and twenty-four in the single mesial cluster below. Four branchial arches lie entirely behind these teeth, remote from the orifice of the mouth, and furnished with long, slenderly subulate, interior rakers.

The three gill-rays are inserted contiguously into the extremity of the *os hyoides*, the upper one, which lies beneath the suboperculum, being much broader than the other two, particularly towards its end. The gill-membrane is scaly, with smooth, longitudinal lines on the throat where it folds, and, in fact, the whole head is densely scaly, except the few smooth parts that have been mentioned. The hinder edge of the operculum is curved in the segment of a circle, but a small scaly flap attached to the round of the suboperculum renders the opening vertical, the gill-membrane being blended with the throat underneath. In the dried specimen, the preoperculum shows a horizontal under limb, considerably longer than the vertical one, which it meets at a right angle. The inner edge of the disk is more prominent than the outer one, and lies

in the same horizontal line with the lower edge of the preorbital. The corner of the bone is shortly rounded. In the recent fish the scaly integument entirely conceals the bones.

The pectorals, about equal to the head in length, are attached beneath the middle height, close to the gill-opening, and are oblique on the margin, their lower rays becoming gradually shorter. All the rays, eleven in number, are much branched, except the uppermost and lowermost, which are nearly simple, but jointed like the rest, and they are all scaly for more than half their length. Above the fin there is a long, triangular, tapering, acute, scaly appendage. There is no free appendage beneath the fin, but the lower ray is edged by a slip of scaly integument. The truncated ventrals, containing nine rays, the last one deeply divided, are placed fully one-half of the entire length of the fish behind the attachment of the pectorals. They are scaly to an equal extent with these fins, and have a similar appendage above, and none below. The dorsal is opposite to the ventrals, and contains eleven jointed rays, which decrease in length from the second one backwards. The first, which is as tall as the second one, is the only unbranched one; and incumbent on its base there are three very short, thin, unjointed rays. This fin is covered at the base by small scales, which rise from the back with the forward movement of the rays, leaving a smooth line underneath posteriorly. Minute scales also run up between the rays beyond the middle of the fin. The anal, placed midway between the caudal and dorsal, is smaller than the latter fin, but of similar form, and contains seven jointed rays, all branched but the first one, before the base of which there are two tapering rays, without joints, but apparently with flexible tips. The scales are disposed on this fin in the same way as on the dorsal. The caudal does not exceed a tenth of the length of the fish, is nearly even at the end when fully extended, and is composed of nineteen rays, with three short ones above and below.

The scales are oblong, with nearly parallel sides, a truncated base, and the free end curved in the segment of a circle, and strongly ciliated. The basal part is marked by fan-like furrows, which radiate from a point considerably beyond the middle of the scale. When *in situ*, a large part of the scale is covered, the circular tip only being exposed. There are about 178 scales between the gill-opening and caudal fin, and twenty-eight or thirty in a vertical line.

The upper part of the specimens have a glaucous-grey hue, the lower part being reddish, and the two tints meet without mixing in a straight line below the middle. The lateral line is straight, with a scarcely perceptible bend over the ventrals. When examined with a lens, the uncovered disk of a scale appears to be lead grey, studded with black dots.

There are large black patches on all the fins, except the anal, in which the posterior corner merely of the fin appears to have been darkish.

The intestinal canal descends in form of a slender tube for an inch and three quarters in the specimen we examined, and then joins an oval muscular stomach of the size of a kidney-bean, close to its fundus, or lower end.



The pylorus is at the end of the stomach, next the head, and the gut runs from thence straight to the anus, slender, and without dilatations. Five cæca are clustered round the pylorus, and tied down to that end of the stomach by membrane. They are unequal in length, and the tip of the longest passes the fundus of the stomach by half its length. The whole intestinal canal is blackish. The liver, on the contrary, is pale, and is divided transversely on the surface, which is exposed, when the belly is opened, for two-thirds of its thickness, into three unequal slices, that lie upon each other like the leaves of a book. It covers the stomach in that position, but not the tip of the long cæcum.

DIMENSIONS  
OF THE SPECIMEN IN SPIRITS.

Length from tip of snout to end of caudal-fin .....	12-45 inches.
" " edge of gill-flap .....	2-22 "
" " mouth .....	0-52 "
" " eye .....	0-85 "
" " vent .....	8-92 "
" " base of caudal .....	11-20 "
Thickness, and also height of body .....	1-00 "
Height of tail .....	0-50 "
Distance between ventrals .....	0-25 "
Length of stomach .....	0-80 "
Width of ditto .....	0-40 "

The other specimens are a few inches longer.

HAB. West Australia and Port Nicholson, Cook's Strait, New Zealand.

EMMELICHTHYS NITIDUS. Richardson.

RADI:—B. 7; D. 13;—9 vel 10; A. 3|10; C. 17½; P. 19 et 3; V. 1|5.

Plate XXIX., figs. 7, 8.

This fish is also a discovery of Sir George Grey's, in West Australia. I feel at a loss as to the genus, or even family, to which it properly belongs; and the specimens being merely dried skins, furnish external characters only. Judging from these, I am inclined to think that it has the nearest affinity with the *Menide*, and with *Cæcio* particularly; but from this it differs in having seven gill-rays, a deeply and widely-notched dorsal, scaly sheaths to the fins of a different character, and the snout, gill-pieces, and maxillaries, more extensively and closely scaly. It is not without a general resemblance to some *Centropristes* of the *Arripis* group, but here again the toothless roof of the mouth, and the very peculiar arrangement of the scales on the head, are sufficient to keep it distinct. It has little resemblance to the true *Scænidæ*, with double dorsals and cancellated, convex skulls, while the absence of pores on the lower jaw discovers it from *Hæmulon*, *Pristipoma*, *Diagramma*, &c. In the extent of the scales of the head, and some other characters, it resembles *Glaucosoma*, but differs from it widely in general aspect, in dentition, the protractile mouth, and many other particulars. The want of teeth is a significant character, which it has in common with *Maquaria*, but the latter has only five gill-rays. Under these circumstances, I have distinguished the fish by a new generic name, constructed, in allusion to its peculiarly neat aspect, from *quærens concin-*

*nus*, and *ixos*. The three short, slender, lower rays of the pectoral are not branched, but it differs in aspect, as well as in the nature of its scales, from *LATRIS*, in which this peculiarity in the form of the pectoral extends to a greater number of rays.

EMMELICHTHYS.

*Forma corporis Smaris vel Cæcionis.*

*Os terminale, rectè antrorsum protractile omnino edentatum. Dentes pharyngei setacei. Maxillæ densè squamose. Intermaxillaria labiaque nuda.*

*Preorbitale disco nudo, inequali, semiovali, margine inferiori concavo vix crenulato.*

*Preoperculum parabolicum margine gracillimo tenuiter sulcato vix crenulato. Suboperculum margine arcto, submembranaceo tenuissimè costato, hinc ciliato-dentato. Operculum emarginatum, angulis planis acutis. Scapula squamiformis, eroso-dentata, squamis parvis tecta.*

*Apertura branchialis ampla infra ante medios oculos fissæ. Radii branchiostegi septem.*

*Pinnæ ventrales sub antica parte pinnæ pectoris affixæ.*

*Pinna dorsi longa eque ac pinna ani in sulco squamoso moxens. Pars ejus spinosa squamosa. In parte alterâ et in pinnâ ani, theca squamosa ferè ad apices posteriores attenuatus excurrit. Pinnæ omnes aliæ usque ad medius squamosæ.*

*Anus pone medium piscem.*

*Squammæ ctenoideæ, mediocres, caput undique præter discum preorbitales, labia, partes membranaceas oris et membranam branchiostegam tegentes. Squammæ genæ temporum operculorumque ordine quodam peculiari, circulari concinniter instructæ.*

In general form this fish has much of the neat aspect of a *Smaris*. The body tapers gradually to the base of the caudal, the profile of the tail being merely a continuation of the curve of the dorsal line, and the lateral line, which is traced at three quarters of the height, runs parallel to the back in a very flat arc, without the usual change to a horizontal direction after passing the dorsal and anal fins.\* The profile descends considerably in a very slightly convex line from the front of the dorsal to the end of the snout, which is opposite to the pectoral fin, and below the middle height of the fish. The head, when the jaws are retracted, forms less than a fourth of the whole length of the fish. Its height at the nape is between one-fourth and one-fifth less than its length, and its thickness at the gill-covers, where it is greatest, is equal to half its length. The nape and hind head are much rounded transversely. The large and perfectly circular eye is situated high up, without touching the profile, one diameter of the orbit distant from the upper lip and two from the gill-opening. The space between the eyes is equal to one diameter, and is flatish. The circumference of the orbit is scaly close to the ball, the scales concealing the whole suborbital chain, and covering the base of the preorbit. But the anterior disk of this bone

\* The specimens, being merely dried skins, do not show the thickness of the body correctly, nor the comparative acuteness of the back and belly, but the profile seems to be completely preserved.



is naked and uneven, from the prominence of canals in the bone, whose apertures show through the integument as it dries. The fore part of the bone is semi-oval, and its inferior edge, where it joins the rest of the suborbital chain, is widely concave, with a slight waving, or crenature. The nostrils are two small, round, approximated openings, in a short and narrow scaleless space above and near to the anterior canthus of the eye.

The mouth is situated at the extremity of the head, and, though differently constructed, has much resemblance to that of a *Coregonus*. Its orifice, moderately open when viewed in front, is semi-ovate, the horizontal lower jaw being narrower at the tip than the arch of the internaxillaries. The latter bones are protractile, their pedicles being longer than their oral limbs, and reaching, when retracted, nearly to the posterior part of the orbits. The maxillaries have a broad disk, rounded at the end, and densely covered with scales, nearly equalling those of the cheek in size. The end of the bone passes the corner of the mouth, plays over the broad, scaleless coracoid process of the post-mandibular bone, and reaches under the anterior third of the eye. The narrow, sloping, posterior edge of the maxillary only is received under the preorbitar. The under surface of the lower jaw is closely covered with minute scales. The jaws and roof of the mouth are wholly destitute of teeth, and the narrow, but rather free tongue is also quite smooth. The pharyngeal teeth, above and below, are fine, setaceous, and crowded, and the outer branchial arch is fringed with a single row of long, compressed, subulate rakers; the other rakers are short, semilanceolate, and all are rough, with very minute teeth.

The side of the head is convex, the summit of the convexity being at the temples. It is densely scaly, so that no bone is seen. The edge of the preoperculum is curved parabolically, and its border is faintly furrowed, producing slight crenatures, but the scales come to the very edge, concealing the inequalities. The disk of the bone is broad, exceeding the width of the cheek, and being inclined in a different direction, its inner edge shows through the scales. The interoperculum is also broad, being widest opposite the bend of the preoperculum, where it is rounded, and it also is scaly to the edge.\* There are eighteen or twenty rows of scales between the orbit and corner of the preoperculum, and half as many on the disk of the interoperculum.

The gill-cover is very obtuse, with scarcely any soft border. The operculum is situated high up, in respect of the curve of the preoperculum, and is indented by a semi-elliptical notch, with acute corners. This notch is filled with integument, clothed with small scales. The suboperculum slopes downwards, and a little forwards, to meet the interoperculum, but not being so broad, there is a slight notch at the point of junction. Its edge is rather concave, and is bordered by a narrow membrane, which is crossed by fine ribs in a pectinated manner. These are scarcely perceptible to the naked eye, and the very narrow, transparent edge is the only part of the gill-cover which is not scaly. The scapula is visible at the upper angle of

the gill-opening, in form of a large scale, with a toothed edge, and its disk is covered by scales, smaller than the others in the neighbourhood. A row of scales, having their disks strongly impressed by five or six furrows, crosses the nape in the same way as the uncinal circle of *Cæcio*; but in *Emmelichthys* these scales are not very obvious to the eye, and the smaller scales of the top of the head pass gradually into the larger ones of the body. The gill-opening is large, and extends from the scapula perpendicularly, to near the ventral line, and then horizontally forwards to opposite the middle of the orbit. The membrane is sustained by seven thin flat rays, of which the three lower ones are shorter, and graduated. The fourth ray projects as far back as the remaining three, which are more curved upwards, an arrangement that gives a peculiar squariness to the posterior edge of the membrane. The humeral chain of bones is clothed with scales up to the inner edge.

The lateral line is composed of ninety-six scales up to the base of the caudal, there being a forked patch of smaller scales covering the middle rays to near their tips, not included in the reckoning. Each of the scales of the lateral row is marked with two little pits at the end of a short tube. A vertical line contains about thirty scales, of which only eight are above the lateral line, and they are of rather smaller size than those lower on the sides. The scales are truncated at the base, furrowed and crenated, and ciliated at the tip, and roughened by radiating rows of grains or worn teeth to near the middle of the disk. Figure 8 shows a scale from below the lateral line. A patch of small scales covers the bones which support the pectoral rays, extending in a semi-circular manner over part of the fin, and delicate scales extend half way up these fins, as well as up the ventrals. A long tapering scale lies over the ventrals, and there probably existed one between these fins, but if so, it has been destroyed in the preparation of the specimen. The spinous part of the dorsal moves in a furrow, composed of a single row of oblique narrow scales, and a dense patch of scales runs obliquely over the base of the soft rays, up nearly to the tips of the posterior ones. A similar scaly band covers the anal fin to an equal extent. On the caudal the scales extend between the rays to two-thirds of their length, and a more dense scaly patch, already noticed, covers part of the middle rays, as well as their membrane.

The pectorals, triangular and pointed, but not falcate, nor so large as is usual with the Sparoids, are attached obliquely below the middle of the height. The fifth ray is the longest, and the lowest three, which are very short, are not branched like the others. The ventrals, attached under the fore third of the pectorals, have a slender spine, two-thirds of the length of the branched rays. They do not reach beyond the pectorals. The dorsal spines are slender. The first one stands a little posterior to the axilla of the ventrals, or over the middle of the pectorals, and, with the two following ones, is graduated. The fourth is the tallest, being about half as high as the body, the next five decrease rapidly in height, and, at the same time, become more remote from each other than the anterior ones. The remaining four also become shorter in succession, but much more gradually, and in our speci-

\* In *Cæcio*, the circumference of the orbit, the suborbitals, the snout, interval between the eyes, and disk of the preoperculum, are scaleless.



CHEILOBRANCHUS DORSALIS. Richardson.

CH. SPEC. *Ch. nigrescenti-fuscus, lineâ medianâ dorsali, pinnisq; dorsi et ani pallidis.*

RADII:—Br. 3; C. 9.

Plate XXX., figs. 1—5.

The *Synbranchi* hitherto described have the anal aperture situated at the distance of more than two-thirds of the whole length of the fish, from the end of the snout; cylindrical, or round and slightly tapering bodies, compressed only at the tail; a swelling head; a mouth cleft beyond the eye; and they inhabit the warmer parts of the ocean. We have now to describe a fish, possessing many of the technical characters of *Synbranchus*, but with a head almost as small as *Leptocephalus*, the body compressed throughout, and the vent before the middle. Such a difference in form from that of the typical *Synbranchi*, cannot but be attended with some dissimilarity in the habits of the fish, and seems to justify the imposition of a new generic or sub-generic name, though from the want of a sufficient number of specimens, I am unable to describe the anatomical structure with sufficient fulness and correctness. The term *Cheilobranchus* is derived from *χελών*, *labrum in ambitum duco*, and *βραγχία*, and has reference to a small peculiarity in structure, which we have not observed in the *Synbranchi*, viz., the existence of a little roll or lip on the hinder edge of the gill-opening.

## CHEILOBRANCHUS.

Forma compressa postice lineari-lanceolata.

Caput minimum; rostrum obtusiusculum, maxillis aequalibus.

Radii branchiostegi tres. Apertura branchiarum unica, mediana, sub gutture.

Osculum terminale, rictu ante oculos desinenti.

Dentes subulati acuti vel obtusi, unâ serie dispositi.

Pinnæ dorsi et ani humiles, membranaceæ non radiis sustentatæ cum pinnâ caudæ radiatâ coalescentes.

Pinnæ pectoris nullæ.

Linea lateralis porosa. Papilla genitalis minuta (fig. 5).

Squamæ minime vix oculo armato dignoscendæ.

Intestina caeco parvulo munita.

A very small head, sloping upwards from the rounded snout, attains an equal width and height posteriorly, but is still inferior in both these dimensions to the fore part of the body. The thickness is greatest at the shoulder, from whence it diminishes gradually to the extremity of the tail; the height of the body increases to a little behind the anus, where it exceeds twice the thickness of the same part. The hinder part is linear-lanceolate in profile, and acute.

Mouth terminal, with equal jaws, and a very small gape, not extending so far back as the eye. The upper jaw is, perhaps, somewhat protractile, but this could not be clearly made out. A single row of teeth runs round each jaw; eight on each limb. In very young specimens they are subulate, and incurved at the tips, but in the largest, which is the one that is figured, they are obtuse, and nearly cy-

lindrical. They are covered by the rather loose, but not tumid lips.

The nostrils are close above the tumid, lateral eyes; one immediately over the centre of the orbit, and the other, which has a tubular orifice, over the anterior angle of the eye.

The gill-opening is a small transverse slit on the middle of the throat, and distant from the tip of the lower jaw, exactly a tenth of the entire length of the fish. There is no division in the opening, and three slender gill-rays support the membrane on each side. A transverse lip, which rises above the adjoining integument, and has its outer ends free, forms the posterior edge of the orifice, and appears to be capable of closing it very completely, when the inflected edge of the membrane is pressed against it. A little more than a third of the whole length of the fish is anterior to the anus. The dorsal and anal fins show more conspicuously, from being much paler than the rest of the fin. The anal reaches from the vent to the tip of the caudal, and is broadest at about two-thirds of its length from the vent. The dorsal is also highest in the same quarter, but sinks to the level of the back before it comes opposite to the anus, though a pale stripe is continued from it along the middle of the back to the head. Not a vestige of a ray can be discovered in these fins, nor did I, in making the skeleton of a small specimen, observe any traces of interspinous bones, except a single, flat, triangular one at the tip of the tail. This supports nine jointed rays, which are not branched. The united caudal, dorsal, and anal, form an acute tip to the tail.

A straight furrow runs from the head to the base of the caudal, coincident with the spine, and pale lines sloping backwards, ascend and descend from it to the margins of the body, being apparently the tendinous divisions of the muscles, as in *Leptocephalus*, the body being otherwise of an uniformly dark liver-brown colour in the specimens, which have been kept in spirits. The fins are of a much paler brown. I have not been able to make out scales satisfactorily, with a microscope of considerable power, but with a single lens, of half an inch focus, the skin is seen to be closely studded with little round pits, which, from the way that they reflect prismatic rays of light, are most probably formed by depressed, but extremely minute scales.

The skeleton of a small specimen contains seventy-three vertebrae, of which twenty-one are abdominal. The superior spinous processes increase very gradually in length from the head to half way between the vent and the end of the tail, where they are tallest, after which they diminish, giving the lanceolate form to the tail. The last vertebra, small and conical, turns up a little at its tip, to which an obcuneate interspinous bone is attached, for the support of the caudal rays. The under spinous processes posterior to the vent are similar to the upper ones. Each of the abdominal vertebrae has two transverse processes, which diminish in length as they recede from the head, and all the vertebrae have a short acute process inclining forwards from the upper anterior part of their bodies before the origin of the upper spinous processes. The vertebrae are of the usual hour-glass shape, and are fully ossified. No interspinous bones were discovered, except the caudal

one. The examination of the intestines was not satisfactory, but the intestinal canal appeared to be straight, with a stomachal dilatation, and a small obtuse caecum issuing from the upper third or fourth of the canal. The orifice of the anus is wrinkled anteriorly, and has a minute papilla on its hinder border.

## DIMENSIONS.

Length from end of snout to tip of tail .....	3.50 inches.
" " anus .....	1.38 "
" " gill-opening .....	0.35 "

Some specimens do not measure above half this length.

HAB. North-west coast of Australia.

CHEILOBRANCHUS APTENODYTUM. Richardson.

CH. SPEC. *Ch. concolor*.

RADI:—C. 7.

This species possesses much interest, from its high southern habitat, having been found above high-water mark on Penguin Island, in seventy-two degrees of South latitude. It has an uniform pale reddish-brown colour, and its true tint may be, perhaps, changed, by the action of the dung of the Penguins. It is, however, in a very perfect state, and does not appear to have been submitted to the process of digestion in the stomach of any of these birds. It is very similar in form to the preceding species, and the vent has the same relative position. The body is, however, less compressed, and is highest midway between the tip of the snout and anus. The upper profile slopes gradually from thence to the end of the snout, the top of the head being broadish, and flatly rounded. Both the back and belly are more obtuse than in the preceding species, particularly the belly, whose thickness exceeds half the height. The nostrils are situated as described above, and the opening, which is over the angle of the eye, has a tubular lip.

The gill-opening is more distant from the snout than in the preceding species, and has a crescentic form, with the curve forwards. Its hinder lip approaches to the head of an arrow in form, its free ends forming the barbs. A thin fold of the gill-membrane fits closely within, so as to close the orifice perfectly.

The little pits or scales are more readily seen in this than in the other, being easily discovered by aid of a lens with an inch focus. The teeth, disposed in a single row, are truncated, and somewhat compressed or incisorial, and a velum spreads over the roof of the mouth, from behind the upper ones.

## DIMENSIONS.

Length from end of snout to tip of tail .....	1.54 inches.
" " anus .....	0.98 "
" " gill-opening .....	0.29 "
Height of body .....	0.28 "

PRYMNOTHONUS HOOKERI. Richardson.

Plate XXX., figs. 6, 7.

The figure here introduced is copied from a pencil drawing (No. 217) by Dr. Hooker, and we can give little more information than the sketch conveys, the notes made at the time by Dr. Hooker having been mislaid. The specimen measured an inch and a quarter in length, but it has perished, not having been found in the collection. It is evidently a Muraenoid fish, closely allied to the Congers, but is remarkable in that family for the shortness of the belly, the vent being only a fourth of the whole length distant from the snout. The gill-openings are lateral, but their position will be unusual, if the oblong white mark before and below them be meant to represent a pectoral fin. It seems to be placed too far forward for that member. The generic name is derived from the backward position of the dorsal, from *πρῦμα*, *puppis*, and *ὄπισθον*, *velum*, i. e. mizen-sail. The caudal and part of the anal are marked as rayed, and a note subjoined to the drawing, states that rays were not perceptible in other parts of the fins. It would be unwise to attempt drawing up a generic character, without further information, but it appeared advisable to give the figure a name, for the sake of reference. Several other variations in the distributions of the fins of the *Muraenidae* have been published since the appearance of Cuvier's arrangement of the family in the *Régne Animal*, among the most remarkable of which are the *Rataibourna* of Gray, in Hardwicke's 'Illustrations of Indian Zoology,' and the *Uraptera* of Rüppell (*Neue Wirbelthiere*).

LEPTOCEPHALUS ALTUS. Richardson.

Plate XXX., figs. 8—10.

This figure is in the same predicament with the last-mentioned, the specimen not having been found in the collection. There can be no doubt about the genus, I think, though the species differs from the European one, in the greater depth of its body, and the very backward position of its vent. When the fish was caught, it was transparent, so that the course of the intestine along the under edge of the body could be readily seen, and a stomachal dilatation was perceived at about a sixth of the whole length behind the head; but as soon as it was put in spirits it changed throughout into opaque white, and rolled into a ball. Another species of the same relative height with *Leptocephalus morisii* was taken by the Expedition to the North of St. Helena; and Cuvier mentions, in the *Régne Animal*, that he is acquainted with several species from the tropical seas, but we are not aware of figures having been published of any but the European one, which is common to the English Channel and to the Mediterranean. We received a specimen of it from the temporary volcanic island off Sicily, named Graham's Island, on which it was found dead.

HAB. Dr. Hooker's drawing is numbered 166, and dated April 11, but neither the year nor locality are noted.



XYSTOPHORUS. Richardson.

Plate XXX, fig. 22.

We here exhibit another of Dr. Hooker's drawings (No. 90), representing a small fish taken at sea. It appears to be a fish of the Cottoid family, and is named from the armature of its head. Judging from the figure, the formula for the fin-rays appears to be D. 5/24; A. 3/16, &c., and the fish would seem to be scaleless, from the way in which the muscular fibres are shown.

OSTRACION BOOPS. Richardson.

RADII:—C. 12; A. 14; P. 14. (Dr. Hooker).

Plate XXX, figs. 18—21.

Being unwilling that any of the novel forms of fish sketched by Dr. Hooker should be altogether lost to science, though the specimens from which they were designed have perished, we here present an Ostracion, in which the chief novelty appears to be the want of a dorsal fin. Dr. Hooker has given four views of this little fish in different positions, viz., 18, a lateral view, 19, a view of the back, terminated at each end by a long spine, and with two smaller intermediate eminences, which seem to replace the dorsal fin. Fig. 20 shows the under surface, when the fish is turned, so as to bring the mouth and frontal spine into view; and 21, the posterior surface, looking from the vent over the anal and caudal fin to the long caudal spine. The drawings are numbered 34 by Dr. Hooker.

HAB. Taken in the South Atlantic, in a tow net.

SYNGNATHUS HYMENOLOMUS. Richardson.

CH. SPEC. *Syngn. corpore valdè compresso, superne inferneque membranâ latâ marginatâ; caudâ quoque superne antice marginatâ.*

RADII:—D. 41; C. 8. SCUTELLI.—*corporis* 30; *caudæ* 67.

Plate XXX, figs. 11, 12, 13.

Baron Cuvier, in the *Règne Animal*, divides the *Syngnathi* into four groups, characterized by the number of fins they possess. The species we have figured having merely a dorsal and anal, would enter the third group, of which *Syngn. æquoreus* of Montagu (Trans. of the Wern. Soc. i. pl. 4, fig. 1) is the type, but it has also a broad, thickish, membranous border, or adipose fin, not noticed in any described member of the genus, which may be considered as giving it a claim to be ranked as the type of a separate group. It is not, however, advisable to attempt giving its distinctive characters in this point of view, until the whole family shall have been revised, for the purpose of fully discriminating the various groups which it comprises, and arranging the known species, now become numerous. My friend Mr. Gray has made some progress in this task, which could not be in better hands; in the meantime, I have given the fish a specific name, indicating its most striking peculiarity, and which may be employed as a generic

appellation hereafter, if need be. It is compiled from *υακρυ, membrana*, and *μαργα, margo*. The British Museum possesses many specimens brought from the Falklands, by Mr. Wright, which Mr. Gray has kindly permitted me to examine, and they would appear to be all females, or at least they show no traces of pits on the belly, for the reception of the eggs, such as we observe in the male *Syngn. æquoreus*, nor of a pouch under the tail, as in the groups which have four or five fins.

In this *Syngnathus*, the vent is a very little posterior to the middle, and the body is much compressed, with flatly convex sides, edged on the dorsal and ventral line by broad, thickish, opaque folds of skin, which double its height. The shields by which the body is protected, show very slightly through the integument, and are not angular. The upper cutaneous border is interrupted on the twenty-first shield, on the hinder part of which the dorsal begins, and is continued to the thirty-third shield. On the thirty-fourth shield the border again appears, but not so broad, and it goes on decreasing in height to the eighty-eighth, where it ends, the tail at the same time growing more and more slender, and ending in a narrow point, but supporting a very small caudal, with eight simple jointed rays. The under cutaneous border ends just before the anus, around which there is a dense patch of villi, which conceal the orifice, and cover a space of the length of a shield and a half.

The snout, measured to the fore part of the orbit, is one twenty-fourth part of the entire length of the fish, and the head, from the tip of the snout to the end of the operculum, forms between the twelfth and thirteenth part. The snout is compressed, obtuse above, and more acute below. A flattish space, with a faint mesial ridge equal to a diameter of the orbit, separates the eyes above. A smooth, somewhat elevated, superciliary ridge on each side of this space, and extending to the nostrils, renders it concave. The operculum is obtusely oval, and it shows little pits on its surface, disposed in lines. Other parts of the head and snout show similar pits as the fish dries, but in the recent state, the bones must be tolerably well covered by the integuments, and there are no rough ridges, or angular points, except a projection, apparently of the suboperculum, which is joined to its fellow underneath, and points directly downwards, below the short vertical limb of the preoperculum. The gill-opening is very minute, and is pierced over the posterior quarter of the operculum.

All the specimens have been kept long in spirits, and have a dull brownish tint, without spots.

## DIMENSIONS.

Length from end of snout to tip of tail .....	12·05 inches.
"                    " vent .....	0·15 "
"                    " end of gill-plate .....	0·95 "
"                    " gill-opening .....	0·91 "
"                    " eye .....	0·50 "
Length from vent to tip of tail .....	5·90 "

Some specimens measure five or six inches more in length.

HAB. The harbours of the Falkland Islands.



## LABRUS CELIDOTUS. Forster.

RADII:—D. 9|10; A. 3|10; C. 14 $\frac{1}{2}$ ; P. 12; V. 1|5.

*Labrus celidotus.* Forster, *apud* Schneider, p. 265. *Id. Desc. Anim. curâ Licht.* p. 133.

Plate XXXI., fig. 1, 2, 3, 5, natural size., fig. 4 magnified.

The form of this fish is pretty regular, the central and dorsal curves differing but little from each other. The slope from the upper lip to the dorsal is gradual, and similar to the posterior curve of the back, and the height of the body, which is greatest under the fifth dorsal spine, is equal to the length of the head, and is contained three times and a half in the total length of the fish. Forster makes the head one-sixth of the total length, but his measurement is evidently made on the crown of the head, and not to the tip of the gill-cover. The thickness of the body is inferior to half its height.

A small canine tooth stands forward at the angle of the mouth, being implanted in the upper jaw; and behind the single visible row of teeth in both jaws there are much smaller ones similar to them in form nearly hidden by the soft parts. Other *Labri* have also these interior teeth, and the dorsal and anal fins are quite destitute of the scaly sheaths of the *Cosyphi*, neither is there any enlargement of the jaws. There are many pores on the preorbitar, the suborbitar bones, the preoperculum, temples, upper surface of the cranium, and first row of nuchal scales. The cheeks are covered by five or six rows of small scales, but on the gill-cover the scales are as large as those of the body. The lateral line is traced on twenty-eight scales, and descends suddenly behind the dorsal and anal fins for the breadth of a scale. Its muciferous canals on the anterior scales make a single fork like the letter Y, but are more branched on the posterior ones. Each scale is obscurely three-lobed at the base, with numerous fan-like furrows, and there are also some less regular diverging lines on the exposed part of the disk. The spines of the dorsal and anal are rather slender, and the caudal is even at the end.

Forster describes the colours as follows: forehead and back deep reddish brown, the sides green, and the belly silvery white. Caudal fin and gill-covers greenish brown, a roundish black spot an inch and a half in diameter, high on the side opposite to the anus, and three obsolete brownish black streaks towards the tail. The pectoral, ventral, and anal fins are yellow; the latter being marked by two or three black spots, and the dorsal by more scattered ones. Our specimens have lost their original tints by long maceration in spirits, but the lateral spot is still conspicuous, though of a smaller size than it is described to be by Forster. It is crossed by the lateral line. The disks of the scales are much darker than their margins, especially on the flanks; there are two dark streaks on the temples, a few spots on the anal, and the dorsal is clouded by ill-defined spots.

Ons. The *Sparus notatus* of Solander (Mss. Pisc. Austr.; Parkinson 37, Icon ined. Bibl. Banks; Richardson, Ann. and Mag. of Nat. Hist. xi. p. 425), has considerable re-

semblance to this species in the distribution of its dark tints, as well as in its external form, but the large, oval, black spot is situated some distance below the lateral line. The *Labrus pecilopleura* of New Zealand, as far as we can judge from the description of it in the 'Histoire des Poissons,' (p. 13, 95), does not differ specifically from Solander's *notatus*. These species, and several other Australian *Labri*, viz. *L. tetricus*, *fuicicola*, *luteiclavus*, and *psittaculus* (Richardson, Zool. Trans.); and also the *L. ephippium* and *gagi* of the 'Histoire des Poissons,' agree with *celidotus* in the numbers of the dorsal and anal spines, and differ widely in that character from the European *Labri*.

HAB. Seas of New Zealand and Australia, Southern Island of New Zealand, (Forster); Woosung, North of China, (Sir Everard Home).

## LABRUS BOTRYOCOSMUS. Richardson.

RADII:—D. 9|11; A. 3|10; C. 12 $\frac{1}{2}$ ; P. 12; V. 1|5.

Plate XXXI., figs. 6, 7, 8, & 10. natural size; 9 magnified.

This *Labrus* is very much like the preceding one, the most palpable difference being the existence of a cluster of black dots above the lateral line and under the posterior dorsal spines, with a longitudinal bar on the dorsal and another on the anal, in place of the lateral spot and other markings of *celidotus*. There is also a pale blue streak running up the posterior border of the preorbitar and along the suborbitar chain. The dentition does not differ from that of *celidotus*, and there is a similar minute canine at the angle of the mouth. On comparing the specimens closely with one another, the following differences were detected in form. The profile of the snout of *botryocosmus* is gibbous, its snout is wider, and the curve formed by the junction of the cranium with the scaly nape is more contracted than in *celidotus*. The posterior limb of the preoperculum is nearly erect, and meets the lower limb at a right angle, while in *celidotus* the angle is much more open. The scales of *botryocosmus* are in general more elongated, and the tubes which mark out the lateral line are simply forked in the tail, and more branched anteriorly, contrary to what is observed in *celidotus*.

HAB. Coasts of South Australia and Van Diemen's Land.

MACROURUS, *vel* LEPIDORHYNCHUS DENTICULATUS. Richardson.

CH. SPEC. *M. squamis ovalibus rotundatisse non carinatis postice spinuloso-hirtis; radio pinne dorsalis antice subnatico; pinnâ dorsi secundâ longius pone anum incipienti.*

RADII:—D. 12—? A.—? P. 18.

Plate XXXII., fig. 1. natural size; 2, 3, magnified.

About eight species of this genus are now known; viz. two which inhabit the Greenland seas, two belonging to

the Mediterranean and adjoining districts of the Atlantic, one to the Canaries, one to the sea of Japan, and two to the seas of Australia. The chief peculiarities of the species now first named are indicated in the specific character given above. It agrees with *M. stromii* of Reinhardt, and the *M. calorrhynchus* of the Mediterranean and Madeira, in the scales being armed on the exposed part of their disk by slender subulate or setaceous spines, not disposed in any definite order. *M. fabricii* (Sundevall), *M. sclerorhynchus* (Valenciennes), and *M. australis* (Richardson, Zool. iii. p. 151, pl. 8, & 1) have the scales armed with spines ranged in rows and incumbent on each other, forming toothed ridges. The *trachyrhynchus* of the Mediterranean, and *japonicus* (Temm. et Schlæg.; Krusenstern, t. 60, f. 8, 9), differ from the others, in having tapering acute snouts.

Our specimen of *M. denticulatus* was thrown up on the beach of South Australia, and has lost the end of its tail. It was dried, and the soft parts about the snout have shrivelled away, so that the true form of that part is still unknown. The mouth appears to be more nearly terminal than in the other species, and is certainly much more so than in *M. australis*. The eye also is larger, and the flat cheek and sloping disk of the preoperculum do not taper to a point as in that species. There is a thin temporal ridge; the first dorsal is tall, the second one low, and commencing a good way behind the anus. The first ventral ray terminates in a slender filament, and the upper jaw is armed by longer and more widely set teeth than that of *australis*. A scale from the lateral line is shown in pl. 32, fig. 3, and one from another place on the side in fig. 4.

HAB. Coasts of South Australia.

#### NOTACANTHUS SENSIPINIS. Richardson.

CH. SPEC. *N. capite conico, rostro obtuso; apicibus dentium lanceolatis; pinnis pectoris ad aperturam branchiarum approximatis.*

RADI: — D. 6½; A. 14|—? P. 13 vel 14; V. 2, 7, *cum part suo conjugata.*

Plate XXXII., figs. 4, 5, 7, 8, 9, nat. size; 6, 10, 11, magn.

The specimen from which our figure was made, was thrown ashore in King George's Sound, and has lost part of its tail. It was prepared simply by drying, and on soaking it well in water it resumed its former dimensions, in which state it was drawn by the artist. In general form it resembles *N. nasus*,\* but the snout, though blunt at the point, is more exactly conical, and the profile, instead of being gibbous just behind the eye, has a gentle straight declivity which unites imperceptibly with the dorsal line. The mouth is farther back than in *nasus*, the front part of the cleft being under the nostrils and the posterior corner opposite to the middle of the eye. The maxillary forks at the lower end, its upper prong being an acute subulate

spine, and the lower one a thin linear slip of bone which curves slightly round the corner of the mouth, and is concealed in the thickness of the lip. In *N. nasus*, the upper lip forms an obtuse pendulous lobe at the corner of the mouth, and the maxillary has also a spinous point, which is represented in pl. 55, fig. 2 of the new French edition of the 'Règne Animal,' but omitted by Bloch. Judging from the French figure, the naked parts about the mouth seem to be more extensive in *nasus*. In *sexspinis* the scaly integument comes close to the upper teeth, but the lower lip is naked: the rest of the head is densely scaly, so that the forms of the bones cannot be made out.

The upper teeth (fig. 10) are compressed, with lanceolate, acute tips, which point obliquely backwards. The under ones (fig. 11) are closely set, and have hair-like erect stems with acute slightly incurved tips. The palatine and vomerine teeth are smaller and more subulate than those of the lower jaw, and are ranged in a single series, forming an arc within those of the upper jaw. There are about twenty or twenty-one on each side of the upper jaw, and twenty-four on each limb of the lower one. The scales are small, oval, and impressed by fine furrows, which radiate from an eccentric point. The lateral line is nearly straight and runs above the middle of the height.

The first dorsal spine stands opposite to the posterior third of the ventrals, as in *nasus*, and the third one is opposite to the first anal spine. A small, forked, jointed ray stands in the axilla of the last dorsal spine. Both the ventral spines and the last two dorsal ones are obsoletely jointed, though they are stiff and pungent. The ventrals are completely united to each other, so as to form but one fin, as represented by fig. 5. The anal commences with fourteen acute, pungent spines, but joints are distinctly perceptible in three or four of the posterior ones. The tail being mutilated, we cannot state the number of the soft anal rays, but the form of the portion of fin which remains is much like that of *nasus*. The series of glandular points represented as running along the base of the anal, in the figure of *nasus*, published in the 'Règne Animal,' were not apparent in the specimen of *sexspinis*. Our fish, when entire, must have been upwards of thirteen inches long.

HAB. King George's Sound, Australia.

#### URANOSCOPUS MACULOSUS. Forster.

RADI: — D. 18 vel 19; A. 17 vel 18; C. 9½; P. 16; V. 1½.

*Uranoscopus maculosus*, Solander, Pisc. Austr. MSS., p. 21, An. 1770. *Ur. maculatus*, J. R. Forster, apud Schn. p. 49, An. 1801. *Icon*, G. Forster, 176, 177, Bib. Banks.; Richardson, An. and Mag. of Nat. Hist. ix. p. 207, An. 1832; Forster, Descript. Avim. cur. Licht. p. 118, 1844. *Ur. monostegius*, Schn. *Ur. cirrhosa*, C. et V. iii. p. 314, An. 1829. *Ur. Forsteri*, Id. iii. p. 318. *Ur. Kouripouia*, Less. Voy. par M. Duperrey, pl. 18, An. 1830.

Plate XXXIII., figs. 1—3, natural size.

Solander detected and described this fish, but his notes remaining in manuscript, the species was first made known by Schneider from the papers of Forster. As there are several *Uranoscopes* with single dorsals, Cuvier has justly

\* *Not. nasus; fronte gibbo; dentibus subulatis parum compressis; pinnis pectoris ab apertura branchiarum remotis.*

RADI: — D. 11 —; A. C. 13 136; P. 16; V. 3½.

objected to the specific name of *monopterygius*, as not being discriminative, but as this fault is common to very many of the scientific appellations given to fish, the rule of adhering to the earliest published name, if not preoccupied, seems to be preferable to the introduction of the very numerous changes which would result from an attempt to rectify all objectionable names, and we have, therefore, adhered to Forster's name of *maculatus*, which was published by Schneider simultaneously with the newer and even less distinctive appellation invented by himself, especially as Forster's differs little from that of *maculosus* bestowed on the fish by Solander, its first describer. We have seen several specimens, both from New Zealand and Van Diemen's Land, and have figured one of them, because Lesson's plate does not appear to us to be a satisfactory representation of the species.

The top of the head is quite flat, from the occiput to the end of the snout, and transversely as far as the temples and outer edges of the orbits. A square membranous space is bounded laterally by the rough borders of the orbits, and behind by a cross ridge of bone connecting these borders; the fore edge of the membrane that crosses the pedicles of the intermaxillaries is cut away in a shallow curve, and is the anterior boundary of the square space. The intermaxillaries lie in the same plane with the snout, and descend very slightly when protruded. Cuvier describes the granulations of the cranial plates, as being arranged in lines radiating from nine centres like so many stars, viz., in two rows of four each, and a single roundish occipital plate on the mesial line. It is not easy to make out the nine centres here mentioned. The exact forms of the plates are shown in fig. 2, and most of them are roughened by minute points crowded without order. The outermost posterior plates, however, and two middle pairs, show some radiating lines. The borders of the orbits are very slightly raised, and the granulations of the superciliary plates show a tendency to run in lines. The preorbitary projects two acute points over the limb of the maxillary; and the three suborbitaries which follow occupy but a small part of the cheek, and are all irregularly granulated. The preoperculum is curved in the arc of a circle, is coarsely granulated at its upper end, and covered elsewhere with smooth integument, which is perforated by a double row of pores. Vertical granular lines mark the operculum, with a few coarser grains at its upper angle, but in the recent fish these rough parts are mostly concealed by the integument. The supra-scapulars are densely granulated oblong plates, which in conjunction with the mesial occipital plate form the boundary of the nape. The scapular (or humeral) bone emits a strong spine over the upper angle of the gill-opening; it is slightly curved at the point, and half an inch long in a fish which measures seven inches, though the tips only protrude through the skin. Forster describes it as "*spina valida horizontalis, apice extrorsum flexa, pollicaris*," in a specimen which measured twenty-two inches. The lips are closely fringed with very short slender cirrhi, just visible to the naked eye, and there is a short thick barbel on the chin, which seems to have escaped Forster's notice, and is not indeed very readily discovered unless it be looked for. A slender filament protrudes from within the velum of the lower jaw. The dental plates are

coarsely and thinly villiform at the symphyses and taper away on the limbs of the jaws. The vomerine teeth are minutely villiform, being scarcely visible to the naked eye, and a cluster of three or four somewhat larger ones, crowded together, exists on the fore part of each palate bone, these bones being otherwise toothless. A row of pores runs along the limb of the lower jaw to the preoperculum. The eye is fringed by a narrow toothed membrane, which is not easily seen unless the eyeball be protruded. The lateral line curves gradually from the outer end of the suprascapular towards the beginning of the dorsal, and then runs near the base of that fin, approaching it gradually and slightly in its course; when it arrives at the base of the caudal it bends suddenly downwards to pass between the middle rays of the fin. Throughout its length short lateral branches fringe it beneath, each ending in a muciferous pore. The scales of the body are similar and of an oblong shape. None exist above the lateral lines, nor on the other parts mentioned as being naked in the '*Histoire des Poissons*.' All the rays of the dorsal are jointed, the spinous fin being deficient, but in the dried specimen four obtuse points press up the skin, like so many interspinous bones before the first ray.

The markings are represented in the figure as they exist in a specimen which has been long macerated in spirits, but the following is Solander's description of a recent fish. "*Piscis supernè virescenti-griseus maculis rotundis dilutè et sordidè flavicantibus; subtus e virescente albus. Caput supra cavernosum, pallidè et flavicante et griseo nebulosum. Oculi parvi. Iris griseo et albidò marmorata. Pupilla nigra, supernè et infernè lobulo griseo notata. Pinna dorsalis subglauca: vittà infra medium latà, albidà: radiis supra vittam fuscis, apicibus rubicundis. Pinnae pectorales extus olivaceae, maculis rotundis e virescente albidis fulco marmoratis, internè obscuriores; basi colore pectoris; margines anteriores et posteriores albidè. Pinnae ventrales et anales colore pectoris. Pinna caudalis e rubicundo griseo, fascià ante medium sub-interruptà, latà, sordidè ex albidò virescenti; margo posticus rubescit.*" Forster merely says in regard to colour, "*Corpus supra pallidè fuscum, maculis pallidioribus (in quibusdam albis seu argenteis), subtus candicanti argenteum.*" "*Pupilla nigra, iride aureà; membranà nititante integrà.*"\*

Forster's specimens measured twenty-two inches, and are mostly about seven or eight inches long.

HAB. Seas of New Zealand and Australia. (Also Otaheiti, Forster).

URANOSCOPUS MACROPYGUS. Richardson.

RADI:—D. 30; A. 37; C.  $8\frac{1}{2}$ ; P. 19; V. 15.

CH. SPEC. *U. capite levi inermi; ano sub axillà pinnae pectoris magnè posito; pinnà ani longissimà ante pinnam dorsi unicam incipienti et ad pinnam caudæ*

\* This seems to have been an oversight, arising from the eye being examined when retracted, for the eye-ball is surrounded by a denticulated fringe.

*usque extensâ; squamis mediocribus; lineâ lateralis medianâ rectâ, squamis majusculis tectâ.*

Plate XXXIII., figs. 4—6, natural size.

This Uranoscope differs widely from others of the genus in aspect and several well marked characters. The forward position of its vent, under the lower pectoral rays, and at the beginning of the second quarter of the length of the fish, is remarkable, and distinguishes it at once from *maculosus* and *lævis*, the other two Australian Uranoscopes with one dorsal. It has a genital papilla like the other species. The head is covered with smooth skin, through which the form of the bones, similar to those of *maculatus*, can be made out, but no granulations are visible. The lips are finely fimbriated, and the teeth are villiform.

The eye-ball, which is not ciliated, is retractile, as is usual in the genus. A row of pores traverses the lower jaw and disk of the preoperculum; the operculum is triangular and ciliated on its upper edge and round its point. There is no scapular spine. The pelvic bones are each terminated anteriorly by a spinous point which penetrates the skin. The straight lateral line is traced in the middle of the height on a series of scales larger than the others, which are of moderate size, but much larger than those of *maculosus*. There is no vestige of a spinous dorsal, and the soft fin commences over the space between the sixth and seventh anal rays. Its rays and those of the anal are all jointed and unbranched. The membranes of the fins generally are more delicate than in the other Uranoscopes, and the rays, especially of the pectorals, have more slender tips. The dorsal and anal terminate by a point of membrane exactly at the base of the caudal, which is rounded at its extremity. Pectoral large, and supported by rays which are all forked except the upper one. No barbel on the chin, nor any filament from within the lower jaw. Length of the specimen  $9\frac{1}{4}$  inches. The original tints of colour have perished in the spirits, but the dark markings which remain may be ascertained by consulting the figure. The caudal has a rather remarkable distribution of colour, the upper and lower parts being black and the middle third pale or whitish.

HAB. Port Jackson.

BOVICHTHYS VARIEGATUS. Richardson.

RADI:—B. 7; D. 8|—18 *vel* 19; A. 13 *vel* 14; C.  $11\frac{1}{2}$ ; P. 10 *et* V.; V. 1½.

Plate XXXIV., fig. 1—4, natural size.

Except in a few particulars noted below, this fish answers exactly to the description of *Bovichthys diacanthus* in the 'Histoire des Poissons,' but it agrees less perfectly with the figure in that work (pl. 244). In general form it approaches nearer to Captain Carmichael's representation of his *Callionymus diacanthus* (Lin. Trans. xii. p. 501, pl. 26), which is considered to be the same species with the Chili fish described in the 'Histoire des Poissons'. It may indeed be merely a more perfect example of *diacan-*

*thus*, or a variety, but as it differs a little in the numbers of the rays,\* and to all appearance, considerably in the markings, I have thought it expedient to figure and name it as a new species.

On reading over the description of *diacanthus*, with the specimens of *variegatus* before me, the only discrepancies I could detect were the following. The preoperculum did not appear through the integuments to be either remarkably large or cavernous, but a series of open pores runs round its border. Its edge is even and not undulated. The pectoral overlaps the anal more than in the figures in the Linnean Transactions or 'Histoire des Poissons,' the penultimate anal ray is not so abruptly larger than the preceding ones, and the pectorals and ventrals are more approximated. Five porous lines with short transverse branches are disposed on the gill covers, temples, and scapular region of each side. They are probably what Carmichael denominates "tortuous streaks." The lateral line is composed of a series of raised, flat, triangular eminences, turned alternately upwards and downwards. They appear to be composed of soft integument, and there are no scales on the body, but the skin is studded with microscopical pores which give it a rough appearance, even to the naked eye, yet are not perceptible to the finger. The markings will be best understood from an examination of the figure, with the explanation that after long maceration in spirits the dark portions are blackish brown, and the lighter ones dingy, little or no pure white being visible, except on the throat. One specimen is eight inches long and another five inches.

HAB. Port Jackson.

CENTRISCUS HUMEROSUS. Richardson.

RADI:—D. 6|—17; A. 18; C.  $9\frac{1}{2}$ ; P. 16; V. 1½.

Plate XXXIV., figs. 5, 6, natural size.

We have seen only a dried specimen of this fish, which differs from the common Mediterranean species, chiefly in its high and gibbous shoulder. It has eight radiated plates on each side of the humeral apparatus which supports the large dorsal spine, besides a mesial row of smaller ones; also three rows of plates on the thorax between the gill-opening and ventrals, and some smaller plates between the ventrals and anal fin. A radiated plate also exists above the posterior half of the orbit. The scales are small. The dorsal spine is stout, and has several acute curved teeth at its base in front, and many serratures and denticulations throughout its length on its posterior face. It is followed by five short spines not connected by membrane; the last of these spines is at the base of the second dorsal, which has an obliquely conical outline. The anal is less high, but has a longer base than the dorsal.

The height of the shoulder is contained twice and one half in the total length, and the thickness there is one-sixth of the height. The length of the head and snout ex-

\* *Bovichthys diacanthus*, D. 8|—20; A. 14 (Hist. des Poissons). *Callionymus diacanthus*, D. 8|—20; A. 16. (Carmich.)



ceeds the height at the shoulder. The height between the vent and base of the dorsal is one-tenth less than the height at the shoulder.

HAB. Sea of South Australia. Specimen in the British Museum.

*PSETTUS ARGENTEUS*. Linn. (*Chetodon*).

*Chetodon argenteus*, Linn. *Chinens.* Lagerström, *Amœn. Acad.* Dec. 1754, iv. p. 429.; Forst. *Faun. Sin.*; Bloch, *Schn.* p. 230. Icon. Reeves, 240; Hardw. *Acanth.* 226. Chinese name, *Yin lœn tsang*, "Silver scale tsang," (Birch); *Yen lin tsong*, "Silver scaled tsang," (Reeves).

RADI:—B. 6; D. 8/29; A. 3/29; C. 17½; P. 17; V. 1/5. (Spec. Hasl. Museum).

Plate XXXV., figs. 1, 2, natural size; 3, magnified.

This fish was first described by Linnæus as a *Chetodon*, and its true position in the genus *Psettus* is pointed out in the 'Histoire des Poissons,' (vii. p. 251), where all that is said of it in the 'Amœnités Académiques' is transcribed. Its agreement in many characters with *Psettus commersonii* is there shown, but the height of the body, it is justly remarked, brings it nearer to *Psettus rhombeus*. We are inclined, however, to keep it separate on account of its proportionally larger eye, taller and more obtuse dorsal and anal fins, and from its wanting the black lines which descend from the fore part of the dorsal to the face in *rhombeus*. We possess two specimens, which were taken at Sidney, and which agree closely with Mr. Reeves's drawing, though the latter is a representation of a larger individual.

The height of the body is equal to the distance between the fore part of the orbit and the end of the dorsal and anal fins; and is in proportion to the total length as 27 to 46. The distance between the tips of the dorsal and anal rather exceeds the total length when the fins are fully spread out,\* and the thickness of the body is about a sixth of its height, or less than a tenth of the height, fins included. The scales are small, and cover the whole head and dorsal and anal fins up to the tips of the rays. They are either very deciduous on the caudal, or they only clothe its base. The scales are delicate and feel smoothish to the finger, even when drawn backwards, but under the microscope, the posterior triangular portion of their disks is seen to be studded with minute teeth. A magnified representation of a scale from the lateral line is given in fig. 3. The caudal is nearly even at the end when fully expanded, but seems crescentic when suffered to collapse a little. The spines of the dorsal are drawn in the figure as they appear when elevated; when lying flatly against the front of the fin the anterior ones are scarcely perceptible, and the summits both of the soft dorsal and anal appear more acute and stand out more abruptly from the posterior rays when suffered to fall back a little. The teeth are those of a *Chæto-*

*don*, and the eye is larger and nearer the profile than that of *Psettus sebae* or *rhombeus*. The orbit is only its own diameter distant from the gill-opening, excluding the small peak of the gill-cover.

Mr. Reeves's drawing is eight inches long, and is colored duck-green on the back, fading away at the lateral line into the silvery and very slightly rosaceous scales. The vertical fins are duck-green at the base, and pass into oil-green and sulphur-yellow towards the ends, the anterior summits of the dorsal and anal being dark purplish brown, shaded off in the latter by crimson. The upper parts of the head and gill-cover are blackish green mixed with crimson; and the pectoral is straw-yellow, with an aurora-red tint at its base. Iris silvery and brown.

HAB. Seas of Australia and China.

*SCATOPHAGUS MULTIFASCIATUS*. Richardson.

CH. SPEC. *Sc. fronte concavâ ad naves gibbâ; dorso fasciis plurimis, nigris, transversis notato; lateribus maculatis; post singulas spinas pinne dorsi anique vittâ nigro.*

RADI:—B. 6; D. 11|—1/16; A. 4/16; C. 15½; P. 17; V. 1/5.

Plate XXXV., figs. 4, 5, natural size; 6, magnified.

The body is much compressed, with a short, oblate-oval outline, beyond which the snout and trunk of the tail project. The summit of the back, which is occupied by the spinous dorsal, and the opposite part of the belly, are bounded by nearly horizontal lines. The soft dorsal and anal occupy the whole of the posterior curves. The head forms nearly one-fourth of the whole length, caudal included, and the diameter of the orbit rather exceeds the fourth part of the length of the head. The border of the orbit is obtusely prominent at the upper anterior angle behind the nostril. The preorbital is considerably wider than the rest of the suborbital chain, and an obtuse notch is formed by their junction. The upper limb of the preoperculum is vertical, the corner shortly rounded, and the lower one completely overlies the interoperculum, only a small crescentic part of that bone showing behind the angle of the preoperculum. The edge of the gill-cover is nearly an arc of a circle without any notch, but the upper corner of the operculum makes a scarcely visible prominence. It is rough with microscopical teeth.

The fine brush-like dental plates on the jaws are composed of closely set slender teeth, each of which is tricuspid, with the middle cusp taller than the lateral ones. There are no teeth on the roof of the mouth.

The scales are small and densely tiled, only a small oblique rhomboidal segment of the disk being visible, which is armed with several parallel acutely toothed ridges. The base is undulated, producing three or four indistinct lobes. The general form of the scales is semi-oval with one side shorter. The lateral line runs in the upper quarter of the height until it reaches the posterior third of

\* In the figure of *Psettus rhombeus* in the new edition of 'Règne Animal,' ii. pl. XLII., fig. 2, the height between the tips of the dorsal and anal fins does not exceed the length from the snout to the trunk of the tail, and the eye is less, and further from the profile than in *argenteus*.

the dorsal, when it takes a straight course through the middle of the tail.

The dorsal spines have their broad sides turned alternately to the right and left; the first two spines are short, and the third and fourth are the longest, the succeeding ones decreasing rapidly in height. The spine of the second dorsal is buried in its front, so that only its tip shows. The first and second anal spines are longer than the following two. The soft dorsal and anal are alike, both having a rounded lobe in front higher than the rest of the fin, and the posterior corner also rounded. The caudal is slightly crescentic. This fin and the soft dorsal and anal are rough with minute scales.

The specimen here described is a dried one, and the colours have consequently perished, but the scales retain a peculiar satiny lustre, and sixteen or eighteen narrow black bands remain visible on the back, descending a little below the lateral line, together with many roundish spots lower on the sides. The top of the head and nape are dark, and there is a broad black stripe behind each dorsal spine, and also, but more faint, behind each anal spine. The soft dorsal and anal are also very finely edged with black, but the rest of the fins appear to be colourless.

This species differs in profile from the *Chatodon tetra- cauthus* of Lacépède (iii. pl. XXV., fig. 2, et iv. p. 727), or *Scatophagus fasciatus*, C. et V. vii. p. 144. The vertical bands are of a different description, and there is no trace of the pectorals having been black.

Length of the specimen 10½ inches.

HAB. King George's Sound, Australia.

#### LUTODEIRA SALMONEA. J. R. Forster, (*Mugil*).

*Mugil salmoneus*, J. R. Forster, apud Bl. Schneid. p. 121. *Leuciscus* (*Psycholepis*) *salmoneus*, Richardson, Ann. and Mag. of Nat. Hist. xi. p. 489, July, 1843. *Mugil salmoneus*, Forst. Descr. An. curā Lichtenst. p. 299, An. 1844. Icon. Georg. Forster, in Bib. Banks. No. 237. *Mugil luvareoides*, Solander, Pisc. Austr. p. 15? Names given to it by the native tribes near Port Essington, Mirlé-mirlé, and Orgurkbad. Genus, *Lutodeira*, Van Hasselt, Rüppell.

RADI:—B. 4; D. 15; A. 11; C. 19½; P. 17; V. 11.

Plate XXXVI., fig. 1, natural size; 2, magnified.

The synonyms above quoted, show that much difference of opinion has been entertained respecting the proper place of this fish in the system. Cuvier, and subsequently M. Valenciennes, considered it to be the same with the *Elops machnata*. This mistake is well exposed by Dr. Rüppell in his Atlas, p. 18, and Neue Wirbelthiere, p. 80, but he also is in error in supposing that the species is the same with the *Mugil chanos* of Forskal. Van Hasselt in the year 1822 noticed the *Mugil chanos* in Ferussac's 'Bulletin des Sciences,' (ii. p. 92), under the appellation of *Lutodeira*, and Rüppell in his Atlas gives the generic characters at length, with a full description and figure of the species, identifying it with the *palah-bontah* of Russell, 207. The *toolelo*, No. 208, of the latter author is a second species of *Lutodeira*, and Forster's fish is a third one. In

the 'Annals and Magazine of Natural History' I gave a full description of Forster's species from the dried skin of an individual which was taken in the harbour of Port Essington. Having overlooked Dr. Rüppell's able exposition of the genus, I fell into the error of taking the fish for a Cyprinoid, and named it *Leuciscus* (*Psycholepis*\*) *salmoneus*. This mistake is strongly animadverted upon in a note appended to page 300 of Forster's 'Descriptions Animalium,' recently published by Lichtenstein, which I refer to chiefly because Mr. Gray's name is there associated with my own, but the error was wholly mine.†

If great authorities can excuse a mistake of the kind, the first of modern ichthyologists may be added in the following sentence, "le *Mugil chanos* de Forskal est de la famille des Cyprins." (Cuv. Reg. An. ii. p. 233): and in recognising the connexion between Forster's fish and Russell's *palah-bontah* and *toolelo*, which he considers to be *Cyprini*, I followed him without due consideration. I could not ascertain the form of the pharyngeals from the dried specimen, the back part of the skull having been cut away, but the head exteriorly exhibits none of the characters which have been indicated by M. Agassiz, as characterizing the skull of a Clupeoid. The parietal crests do not show at all, and are not prolonged, nor is there a deep notch in which the occipital crest stands. No crests run from this notch to the middle of the orbit, there are no temporal grooves, nor does the triangular depression of the forehead, so conspicuous in most Clupeoids, appear. It is possible that some indications of these generic peculiarities might be traced in a properly prepared skull, but they do not show through the dried integument. The composition of the orifice of the mouth, however, is clupeoid.

This *Lutodeira* has the general aspect and neat appearance of a *Coregonus*. The length of the head, which somewhat exceeds the height of the body under the dorsal, is contained five times and a half in the total length of the fish, caudal included. The profile is a narrow ellipse, the back and belly being bounded by equal curves, rising regularly from the mouth to the front of the dorsal, which is the middle of the length, caudal excluded. At the base of the caudal the height is less than one-third of that before the dorsal. The head is covered with a smooth nacre skin, which is continued evenly over the cheeks and gill-covers, so that the limits of the opercular pieces can scarcely be distinguished even in the dried specimens, the under border of the preoperculum alone being marked out by a fold of skin. The disk of this bone is acutely crescentic, with an obtuse notch on its edge beneath the curve, and its un-

\* The name of *Psycholepis* could not in any case have stood, as it had, together with almost every Greek compound that can be devised to signify sculpture of the scales, been appropriated by M. Agassiz to fossil genera, though I was not aware of that fact when in search of a characteristic generic name.

† The passage is "*Mazine autem Graijus et Richardsonius nobis identiter vituperandi, qui eundem piscem Leuciscum (Psycholepin) salmoneum nuncupant, primi inter omnes Cyprinum in Oceano piscari.*" On this I would further observe that the *Cyprini* are not absolutely confined to fresh waters, some of the *Catostomi* frequent the salt estuaries of the northern rivers of America, and in page 44 of this work I have described a purely marine fish, the *Rhynchana greyi*, which, if it be not a Cyprinoid, seems to be more nearly related to that family than to any other.

der limb, which is very long and narrow, is obscurely marked by a series of pores. The suboperculum shows a smooth, shining, slightly convex linear disk, seven or eight times less in height than the operculum. The eye is large, near the profile, half the diameter of the orbit from the orifice of the mouth, and a diameter and a half from the edge of the gill-cover. The mouth is small and terminal; the intermaxillary thickish, convex, and without protractility. The maxillary is stout and semi-oval, its upper end fits into a notch in the intermaxillary, its lower and wider end plays on the limb of the lower jaw, and only a small part of its shoulder enters into the composition of the orifice of the mouth. There is a slight fold of skin on the edge of the lower jaw, but on the upper jaw the integuments adhere closely to the bones. The four gill-rays are strap-shaped, very thin and flat. There are no scales on the head, which is flattish above and gradually narrows from the nape to the snout. On the occiput the sides of the head are much rounded off laterally, but the upper border of the orbit is prominent and rounded.

The scales are of moderate size, there being eighty-seven on the lateral line, and about twenty-three or twenty-four rows in the height. They are suborbicular, of a delicate texture, and are divided at the base into two or three lobes by shallow obtuse notches, and have none of the usual furrows. The exposed disk is marked by from twenty to forty slightly divergent grooves, producing a corresponding number of rounded ridges, which terminate on the edge in acute points.

A long, pointed scale lies above, and another below the pectoral, which is small and placed low down. The dorsal fin commences exactly midway between the tip of the snout and end of the scales on the base of the caudal fin; its three anterior rays are short, graduated, and closely incumbent, without visible joints; and the margin of the fin is crescentic with acute points, the anterior point being much higher than the posterior one. A scaly fillet embraces the base of the fin like a sheath, and nearly covers the rays, when they are recumbent. The ventrals are attached opposite to the middle of the dorsal. A long acute scale exists above the fin, and a broader and shorter one between it and its fellow. The anal is shaped like the dorsal, but is smaller, and it has a similar scaly sheath which nearly conceals the rays when they are laid flatly back. The caudal fin is very deeply forked, with acute lobes, of which the upper one is rather the longest. Two scaly fillets separate the four central rays from the lobes.

Forster describes the colour as bluish on the back and silvery on the body, the head also shining and silvery, with an ultramarine tint round the eyes and on the fore part of the gill-cover.

The specimen from which our figure is taken was procured in a brackish lagoon near Point Smith, Port Essington, in November, 1844. The one described in the 'Annals and Magazine of Natural History' was speared near the same point, but the natives state that it generally inhabits deep water, and rarely approaches the shore. Length 19 inches.

HAB. North and west coasts of Australia, Torres Straits, Island of Tanna.

*Elops machnata*, Rüppell. Neue Wirbel. 80—84; Richardson, Report on the Ichth. of the seas of China and Japan made to the Brit. Assoc. vol. xiv. p. 310. An. 1845. *Jinagou*, Russell, 179.

RADII:—B. 32; D. 24; A. 17; C. 19½; P. 17; V. 14.

Plate XXXVI., fig. 3, natural size; 4, 5, magnified.

This fish has already been well represented by Russell, and the specimen from which our figure is taken being a Chinese one, has no direct claim for admission into a work devoted to the publication of Sir James Ross's collection, but when the plate was executed some months ago, I was desirous, by directly contrasting the *Elops* with Forster's *Mugil salmoneus*, of placing beyond doubt Cuvier's mistake, in considering the two fish to be one species, not being then aware that this task had previously been performed by Rüppell in his 'Neue Wirbelthiere,' as has been stated above.

The figure is drawn from a dried specimen, which has lost most of its original tints of colour. The suborbital chain including the preorbital is narrow and linear beneath the eyes, and its upper edge is raised in form of a smooth even ridge, which becomes more distinctly tubular, and uneven on the posterior margin of the orbit. The cheek, which is moderately large, is wholly behind the orbit, and the disk of the preoperculum, which is thin, wide, and smooth, has a parabolic outline. One third part of the maxillary passes the orbit, and its whole front edge up to the rounded tip, and the edges also of the intermaxillaries and lower jaw, are rough with small granular teeth; the dental plates widening towards the symphyses, and the interior row of teeth being there rather longer and more acute, since less worn. The teeth on the vomer and palate bones are disposed in considerably broader brush-like plates with a more even flat surface. A smooth low ridge running from the nostrils traverses the anterior frontal bone and disappears on the upper border of the orbit. Another (the lateral ridge) rising also at the nostrils, runs directly backwards in the intra-orbital space, but sinks again to the level of the skull opposite the posterior part of the orbit. The space between this ridge and its fellow is concave; outside of it the skull is convex and rises above it, so that it must be wholly concealed in the recent fish. The temporal ridge is smooth and slightly elevated, though conspicuous enough in the dried specimen. The occiput is convex.

The scales are tolerably large, but being much tiled only a small rhomboidal portion of the disk is visible. Their exterior edges are thin, delicate, and being easily torn, are for the most part irregular. These edges are undulated, producing when *in situ* the semblance of fine teeth or streaks, but when the scales are wet and placed in the microscope the streaks disappear, hence they are not shown in the drawing of the magnified scale, fig. 4. Russell indicates them in his plate, but such fine lines not being suited for lithography, they could not be introduced into our figure without rendering it darker than it ought to be. There are

ninety-two scales in a longitudinal row between the gill-opening and caudal fin, and eighteen or twenty rows in the vertical height under the dorsal. The lateral line is composed of a series of simple tubes, and with a very slight decurvature at its commencement runs nearly straight a little above the middle of the height of the body. The ventrals are attached under the beginning of the dorsal, and in the middle of the length between the tip of the snout and extremities of the central caudal rays. The first five dorsal rays are closely incumbent and graduated, and the upper joints of the third, fourth, and fifth are oblique. The first three anal rays are also short and closely incumbent, and two or three of the following ones have oblique joints. This peculiar obliquity of the joints is well seen in the longest upper and under caudal rays, which are much compressed and broader than the others. Several of the adjacent rays are compressed, with oblique joints in a less degree, and the first of the incumbent basal ones both above and below is thin, white and bony, with a lanceolate outline and very acute tip. It is not jointed, but several which immediately follow it, though less broad and shewing vestiges of joints, have similarly acute tips.

In Mr. Reeves's drawing the scales of the body are represented as brightly silvery, with leek-green shadings from their bases above the lateral line, and pale pearl-gray below. The membranes of the dorsal and caudal are mountain-green with darker rays, a bar along the base of the caudal being also darker; and the central part of the caudal is light bluish gray, without any indication of the black stripe exhibited in Bloch's figure of *Elops saurus*, 493. The upper parts of the head are sap-green mixed with oil-green; the lower parts silvery. The pectoral is gamboge-yellow with a blackish tip; the ventrals and anal dull saffron-yellow in front and colourless posteriorly.

Mr. Reeves figures another Chinese *Elops* (*purpurascens*), which is briefly noticed in the 'Report on the Ichthyology of the Seas of China and Japan,' quoted above.

HAB. Seas of China and India. The Red Sea.

#### GASTEROCHISMA MELAMPUS. Richardson.

*Gasterochisma melampus*, Richardson, Ann. and Mag. of Nat. Hist. xv. p. 346, May, 1845.

RADI:—B. 5; D. 17|—1|10 et VI; A. 2|10 et VI;  
C. 17 $\frac{1}{2}$ ; P. 20; V. 1|5.

Plate XXXVII., figs. 1—3, natural size.

This fish is most closely allied to *Nomeus*, of which it possesses many of the characters, but its larger mouth, the form of the jaws approaching much more nearly to that of *Scouber*, the great compression of the body, and above all, the free pinnules of the dorsal and anal, justify its being placed in a separate genus, in accordance with the manner in which the *Scomberidae* have been hitherto subdivided.

The profile bears considerable resemblance to that of a common mackerel, and the tail at the base of the caudal is very slender, but has no vestige of a keel. The length of the head, which equals the height of the body, is contained four times and a half in the total length, and the thickness

of the body is less than one-third of its height, the back and belly being both acute. The nape is more broadly rounded, but the top of the head is traversed by a smooth, acute, mesial keel, which is continued to the tip of the narrow, acute snout. The lower jaw is also acute, and the cleft of the mouth is half the length of the head. The maxillary reaches rather beyond the middle of the eye, and its slender middle part only is covered by the preorbitar when the mouth is closed. The jaw-teeth are finely subulate, acute, slightly curved, and rather widely set in a single row. The vomerine and palatine teeth are more delicate and not so evenly set.

The cheek is scaly, and there is a scaly patch on the supra-scapulars; but the top of the head, jaws, preorbitar, disk of the preoperculum, and gill-membranes are smooth. There are no scales on the gill-covers in the specimen, but as the integument clothing these bones is injured, it is possible that they may be more or less scaly in the recent fish. The lateral line is moderately arched till it comes opposite to the first separate pinnule, when it takes a straight course through the tail. The scales are moderately large. The belly is deeply fissured to form a sheath for the reception of the large ventrals, in which they can be completely concealed. The inside of this sheath is lined with delicate membrane, and the small tubular orifice of the anus is situated near its posterior end. The ventral, equal in length to one-third of the whole fish, is attached under the base of the pectoral as in *Nomeus*. It is probable that their last ray is attached throughout to the mesial line of the sheath by a wide membrane, as in the genus just named, but if so, the membrane has been torn away in our specimen. The pectorals are in proportion considerably smaller than in *Nomeus mauritii*. The first dorsal is arched, and is supported by slender, brittle rays, which are half the height of the body. The membrane of the posterior part of the dorsal and anal is either altogether wanting or perishes early, leaving six or seven detached pinnules behind each fin. There is no vestige of any separate spines before the anal, and the first spine of this fin is a mere point. The ventrals retain their intense black colour, but the original tints of the other fins and rest of the fish cannot be traced in the specimen, which has suffered from long maceration in spirits.

Length 8 inches.

HAB. Port Nicholson, New Zealand.

#### AGRIOPUS LEUCOPECILUS. Richardson.

CH. SPEC. *Agr. cute levissimo; corpore maculis irregularibus castaneis cum labaculis purpurascens—abdis in humero lineaque laterali alternatibus variegato; parte spinosa pinnæ dorsi nigro marginatâ, parte articulatâ fasciâ nigrâ percursâ.*

RADI:—D. 17|13; A. 9; C. 12 $\frac{1}{2}$ ; P. 8; V. 1|5.

Plate XXXVII., figs. 4, 5, natural size.

The genus *Agriopus* presents the peculiar character from which the *Jones cutrassées* of Cuvier derive their appella-



tion, in a less marked degree than most of the other form included in the group. The infra-orbital chain abuts against the upper end of the preoperculum only, instead of sending a strong branch across the middle of the cheek to the bend of the bone. *Trachinus ripera*, retained by Cuvier among the *Percide*, shows a more distinct bony extension of the suborbitals which crosses the temples to the tip of the preoperculum, and in the *Uranoscopi* the cheeks are largely covered by the suborbital plates. In fact the *Trachini* and *Uranoscopi* associate more naturally with the family to which *Agriopus* belongs than with the *Percide*. Most of the *Joues cuirassées* live habitually at the bottom of the sea and travel over the sand or mud in search of their food. The *Trigla* possess simple, free rays under the pectorals, which they use as feet, and perhaps also as organs of touch. The projecting thick tips of the lower rays of the pectorals, and frequently also of the ventrals and anals, so evident in the majority of the members of the group, are most likely formed for similar uses, and in this structure the *Trachini* and *Uranoscopi* agree, as well as in the copiousness of their mucigenous glands. Most of the fish that dwell at the bottom of the sea and burrow in the sand require to have their skins well lubricated, a fact which may be gathered from an examination of the *Batrachide*, *Muraenide*, *Siluride*, *Gobiide*, and of the family now under consideration.

As far as I have been able to ascertain, the *Agriopi* exist in the southern hemisphere only; and of the five species that have been described, three frequent the Cape of Good Hope and two the coasts of Chili and Peru. Three have bristly or warty skins, viz. *Ag. verrucosus* (Cuv.), *Ag. spinifer*, (Smith, South Afr. Zool.), and *Ag. hispidus*, (Jenyns, Zool. of Voy. of Beagle); while two, *Ag. torvus* and *Ag. peruvianus* have smooth skins: *Ag. leucopacilus* being also quite smooth, brings the numbers of the smooth and rough-skinned species that are known, to an equality.

This fish differs from other species, in being rather less tapering posteriorly. The height of the body is one-third of the total length, and is greatest at the attachment of the ventrals, where the thickness is less than half the height. The head forms one-fourth of the entire length. The pelvic bones being depressed, makes the height at the nape considerable, and brings not only the ventrals, but even the pectorals beneath the level of the under part of the head. The small terminal mouth is rather above the level of the lower third of the body. The orbit having a somewhat ovate form and encroaching upon the profile, is midway between the orifice of the mouth and gill-opening, being rather more than the length of its own diameter from each. Its upper border being a little elevated, renders the interorbital space slightly concave. This space is broadest behind, where it equals the vertical diameter of the eye. There are no spinous points whatever on the head, but the bony surfaces are granulated, the grains being ranged on the disks of the preoperculum and parietal bones in radiating lines, and in two parallel lines in the interorbital space. Faint streaks not granular are perceptible on the operculum, which is clothed with smooth integument. An elevated, linear, granulated disk of one of the bones of the humeral chain lies behind the small vertical gill-opening. The gill-membrane is continuous with the adjoining inte-

gument, and only three gill-rays shew through it in the dried specimen. The teeth on the jaws are crowded and setaceous, higher on the lower jaw, and not forming broad dental plates on either. The vomer appears to be quite smooth.

The dorsal is shaped like that of the rest of the genus, but is not so steeply arched as in some species. The fifth spine is the highest, and considerably exceeds half the height of the body. The last spine is considerably taller than the penultimate one, and the soft part of the fin rises above the nine posterior spines. The ventrals are attached a little posterior to the pectorals and opposite to the seventh dorsal spine. This spine is striated, stout, and one-third shorter than the jointed rays which are unbranched. The pectoral rays, eight in number, are also unbranched, and the lower four have the membrane deeply notched between their tips. There is no vestige of a spine in the anal fin. Length of the specimen about nine and a half inches.

HAB. South-Australian Sea.

*LOTA BREVUSCULA.* Richardson.

RADI:—B. 7; D. 8—48; A. 50; C. 17½; P. 22; V. 6.

Plate XXXVIII., figs. 1, 2, natural size.

This small ling approaches the *Lota bacchus* of Forster, (*ruginosa*, Solander?) in its form and characters, and in a less degree the *L. magellanica* and *rhacina* of the same naturalist, but we cannot venture to refer it to any of these species on account of the difference in the numbers of its rays.\*

The length of the head, which scarcely equals the height of the body, forms a fourth of the whole length of the fish, and the thickness before the first dorsal is equal to two-thirds of the height. The profile rises gently with a slight convexity from the obtuse snout to the first dorsal. The eyes are a diameter of the orbit apart, and are placed at the same distance from the tip of the snout, but fully two diameters from the edge of the gill-cover. The mouth is beneath and rather behind the end of the snout. The jaws are armed by villiform bands of teeth of even height, and the pharyngeals are rough with minute teeth, but the front of the vomer, the palate-bones, and rest of the mouth are covered with smooth white integument. The scales are of moderate size compared with those of other *Gadide*, there being only seventy-two rows between the gill-opening and caudal fin. They cover all the head except the preorbital, jaws, inter-operculum and gill-membrane. The first dorsal, having a triangular form, stands as high as the second one and contiguous to it. The vent is under its posterior rays. The ventrals are slender and are split at the tip into two unequal filaments. Caudal rounded. Length of specimen nearly seven inches; its colour faded.

HAB. Bay of Islands in New Zealand.

\* *Gadus ruginosus*, Sol. B. 7; D. 10— A.— C.— P.— V.—  
 „ *bacchus*, Forst. 7; 10—42; 40; 26; 22; 6.  
 „ *magellanicus*, Forst. 6; 5—31; 25; 14; 17; 6.  
 „ *rhacinus*, Forst. 7; 5—68; 62; 28; 22; 6.

PETROMYZON MORDAX. Richardson.

RADI:—D. 53—80; C ?

Plate XXXVIII, figs. 3—5 natural size; 6 magnified.

In this lamprey the vent is one-seventh of the whole length of the fish distant from the tip of the tail, and the first gill-opening is at an equal distance from the end of the snout. The first dorsal, short and rounded, is considerably behind the middle of the fish, and is widely separated from the second one, which is much longer and passes the vent by a quarter of its length. The caudal is divided into an upper and under lobe, which vanish at the tip of the tail. Delicate rays support these fins, but the thickness of the skin prevented me from reckoning them. None exist at the extreme tip of the tail, nor in a low membrane which connects the upper caudal lobe with the second dorsal. There is also a short membrane destitute of rays before the under lobe, and a pale mesial stripe extends from it to the vent. The rest of the fish is coloured dark amber brown, paler on the belly, and there is a pale spot between the eyes, behind the solitary nasal tube.

The orifice of the mouth is a longitudinal slit, armed on the edges by acute teeth set alternately in two rows, as represented in figure 5. Figure 6 exhibits the inside of the mouth with the lips shaved off, and shows a circle of about thirty small acute teeth, with a solitary one in front. More within before the œsophagus there is a horny plate on each side of the mesial line, having three conical, acute cusps; and beneath the œsophagus there are five teeth ranged in a transverse curve terminated at each, end by a larger tooth having two acute cusps. The tongue is represented by the artist as projecting forwards and nearly concealing the orifice of the gullet, but the exact form of the two large teeth on its fore edge is not well shown. Though these teeth appear conical when viewed in front, they have, in fact, a crescentic, serrated, cutting edge, and they are inclined to each other, so as to meet on the mesial line in an acute angle: behind them there is a row of small teeth like a saw, on each side of the tongue, which are not shown in the figure. The *P. tridentifer* of the *Fauna Boreali-Americana*, another species from the Pacific Ocean, has the teeth very differently arranged.

Length of the only specimen of *P. mordax* in the collection,  $10\frac{1}{2}$  inches.

HAB. Seas of Van Diemen's Land.

CHATOËSUS COME. Russell.

*Clupea thrissa*, Russell, Coromand. Fishes, ii. p. 76, pl. 196. (Kome).

RADI:—B. 4; D. 17; A. 22; C.  $19\frac{1}{2}$ ; P. 15; V. 8.

Plate XXXVIII, figs. 7—10, natural size.

Our specimen of this fish is rather higher in proportion to its length than Russell's figure, but as in other respects there is no marked discrepancy, and the numbers of the rays do not differ more than often happens among indi-

viduals of the same species in this genus, I have not ventured to consider them as distinct. The *Clupea nasus* of Bloch (429, fig. 1.), is a more slender fish, whose height, if we may judge from the drawing, does not exceed one-fourth of the total length. Cuvier considers *come* and *nasus* as the same species, and Russell on the other hand refers *come* to the *Clupea thrissa* of Bloch, but we do not think that either of these approximations can be supported by the figures.

This fish is greatly compressed, its thickness being little more than one-fifth of its greatest height, which again is equal to one-third of the length including the tips of the caudal fin. The profile excluding the tail is a regular oval. The belly is serrated and very acute, and the edge of the shoulder from the fin to the cranial plate is also very acute. The head forms about one-fifth or rather more of the total length, and it has the usual cranial plate, covered with smooth skin. This plate has an almost obsolete central ridge, from whence it slopes very gently to each side. It is bounded laterally by the orbit, and a groove running backward and terminating on the side of the occiput in six or seven short furrows, as shown in figure 8. The nose projects a little beyond the small, toothless mouth, whose orifice when viewed in front is triangular, and the tip of the lower jaw fits into a smooth notch in the middle of the upper one. The small, slender, linear maxillary is not concealed by the preorbitar when the mouth is closed. There are about forty scales in a longitudinal row and fifteen or sixteen rows in height. Faint impressions on the scales, give the appearance of as many lateral lines as there are rows, but there is no well-marked lateral line. The exposed disks of the scales are narrow, vertical rhombs with sharp angles. A detached scale is transversely oval with obtuse ends, without fan-like streaks on the base, and having the uncovered edge rather deeply crenated. Scaly sheaths exist at the bottom of the dorsal and anal; and long scales lie over the pectoral and ventrals and also between the latter fins. The caudal is deeply forked, with acute lobes. The ventrals are under the middle of the dorsal. The colour of the fish in spirits is silvery with a bluish gray tint on the back.

Length of specimen  $4\frac{1}{2}$  inches.

HAB. Western Australia. Indian Ocean.

TETRODON VIRGATUS. Richardson.

RADI:—D. 9; A. 10; C. 9; P. 16.

Plate XXXIX, figs. 8—9, natural size.

This *Tetrodon* seems to be nearly allied in form and markings to *T. lineatus* of Linnaeus and Bl. 141, but there is some difference in the distribution of the stripes as well as in their breadth, so that we can scarcely venture to consider them as belonging to the same species, and their very distant habitats is a further presumption against uniting them. The form of this fish when distended is ovate, without a beak, the teeth only and edges of the lips projecting out of the general profile. The nasal orifices are at the extremities of a pair of tubes on each side, resembling bifid

barbels. Slender acute spines stud the whole integument except the lips, a narrow ring round the eye, the fins and their bases, with the greater part of the trunk of the tail. The ground colour is blackish gray on the back, and paler on the sides and belly, and nine or ten blackish longitudinal streaks traverse the whole body. The caudal is darkish, but there are some dark shades on the dorsal and anal, and the original tints of colour have perished through the long immersion of the specimen in spirits.

Length  $4\frac{1}{2}$  inches.

HAB. Port Jackson.

TETRODON HAMILTONI. Richardson.

RADI:—D. 9; A. 6; C.  $7\frac{2}{3}$ ; P. 15.

*Tetrodon hamiltoni*, Richardson, MS. Cat. of Hasl. Mus.; List of New Zealand Fishes, Dieffenbach's Travels, &c. Appendix.

Plate XXXIX., figs. 10 and 11, natural size.

Specimens of this *Tetrodon* have long existed in the Museum of Haslar, to which they were presented by Surgeon Hamilton of the Royal Navy, who procured them in Port Jackson. It appears to be an abundant species in that locality, as the examples of it are numerous in Sir James Ross's collection.

The belly is capable of moderate distention, so as to acquire a considerably greater convexity than the back, but so that the height and width of the body are equal, and then the profile is oblong-oval, the height being one-third of the total length. The nasal orifices are seated in a pouting papilla, and the inner surface of the lips is fringed by short skinny processes. The skin is rough with short simple spines on the back from the nostrils to the caudal, and also on the under surface for the same distance. The flanks are partially rough, minute spines existing on the cheeks, a space behind the pectorals connecting the upper and under spinous surfaces, and also an arch of the tail. The smooth parts are, all the fins and a circle round their bases, including the axilla of the pectoral, the lips and snout back to the nostrils, the chin, circle round the orbit, margin of the gill-opening and the middle of the flanks back to the caudal fin,—the smooth space narrowing considerably posterior to the anus, and being bounded beneath on the tail by a kind of raised porous seam or lateral line. The back is thickly mottled with round spots and minute specks in the interstices. The larger spots on the fore part of the back are ranged in transverse rows, more distinctly in some individuals than in others. The flanks are marked by a series of oval black blotches from the mouth to the tail; and the under surface is white.

The specimens vary from three to five inches in size.

Mrs. Meredith in her 'Notes of New South Wales,'\* speaks of this *Tetrodon* in the following terms. "A disgusting tenant of most of the shores around Sydney, is the toad-fish: most admirably named; it looks precisely like a toad elongated into a fish, with a tough, leathery, scaleless skin, and a bloated body, dark mottled brown above,

and white beneath. It is usually about five inches long, and disproportionately broad, but swims very swiftly, and is for its size, as bold and voracious as the shark. When I said Mr. Meredith *did* not fish with the rod, I might have added that he could not, for the toad-fish, which swarm everywhere, no sooner see anything dropped in the water, than they dart towards it by dozens, and fight among themselves for the honour of swallowing your hook, generally taking the precaution to bite off your line at the same time. This extreme anxiety to be caught might perhaps be pardoned, were the greedy little wretches fit to eat, but they are highly poisonous; and although I should have thought their disgusting appearance sufficient to prevent their being tried, I know one instance at least, of their fatal effects; a lady with whose family I am intimate having died in consequence of eating them. As they thus effectually put a stop to our angling by biting off every hook dropped in the water before any other fish had time to look at it, they especially enjoyed the benefit of the fishing spear, upon which many hundreds, if not thousands, must have been impaled in succession. This sounds very wantonly cruel, but let no one pronounce it so who is not well acquainted with the toad-fish; from those who are, I fear no reproof. When speared, they directly inflate their leathery skins like a balloon, and eject a stream of liquid from their mouths, with a report as if they had burst. If flung again into the water, however wounded, they instantly swim about and begin eating; and should one be a little less active than his fellows, they forthwith attack and eat him up. Even my poor little harmless friends, the crabs, become their victims; when those usually well-armed troops have just got their soft new coats on, and are almost defenceless, then come the cowardly, ravenous toad-fish, and make terrible onslaughts among them, an attention which I believe the crabs eventually repay with interest." (p. 155).

HAB. Sea-coasts of Australia, Van Diemen's Land, and New Zealand.

MONACANTHUS GRANULATUS. White (*Balistes*).

RADI:—D. 21—30; A. 28; C. 12; P. 11.

*Balistes granulatus*, White, Voy. New South Wales, p. 295, pl. at p. 254, lower figure.

Plate XL., fig. 1, natural size; 2, magnified.

Mr. White's figures of fish are in general rudely drawn, and in this one there is a want of detail for the proper discrimination of the species. We are, however, induced to consider a *Monacanthus* obtained by Sir James Ross at Sydney as the same with White's, because the ground colour, the grains by which the body appears to be studded, the profile and the place of capture are the same.

All that White says of his fish is included in the following sentences. "*Balistes pinna dorsali anteriore biradiatâ, corpore granoso. Valde affinis B. papilloso Linnæi. Corpus albedo-cinereus, papillis parvulis aspersum. Thorax velut in sacculum productus.*"

Schneider refers White's fish to the *Balistes papillosus*

\* London, Murray, 1844.

of Linnæus; and Cuvier in the 'Règne Animal' has inadvertently retained the specific name of *papillosus* for the Port Jackson fish, though he separates it from the species described by Linnæus, which he considers to be the same with the *B. monaceros* of Lacépède, i. pp. 336, 386, pl. 17, fig. 3. In this, the rays are as follows: D. 1—48; A. 51; C. 12; P. 15.

Sir James Ross's specimen of *granulatus* has suffered considerable injury from maceration in deteriorated spirit, and perhaps some of the dark patches represented in the figure arise from this, and may not exist in the recent fish. The profile rises to the dorsal spine at an angle of 30°, with a slight concavity behind the lips, giving a somewhat beaked appearance to the fish. The space between the dorsals has a horizontal or slightly concave profile, and the slopes on which the second dorsal and anal are imposed are slightly convex and similar to each other. When the pelvic bone is extended forward to the utmost, the dewlap has a conical bag-like form, and the height of the body, from its apex to the dorsal line, is but little less than half the total length, while the height at the anus is just equal to a third of that length, caudal included. The dorsal spine stands over the posterior third of the eye and the gill-opening, and its length is equal nearly to half the extreme height of the body and dewlap. It is roundish in front, finely granulated, and armed by two rows of stronger acute recurved spinous teeth, with the interval between the rows flat and furrowed. The trigger ray in its axilla is short and bluntish. The second dorsal commences rather before the anus. The point of the pelvic bone is a small knob, studded with twelve or fourteen spinous points diverging in all directions. There are no rays in the dewlap behind it.

The whole skin is studded with spines, enveloped in soft integument, and looking to the naked eye like tubercles or papillæ, which are fully better represented in White's figure than in ours. With a common lens, however, and even when examined with a good light by the naked eye, each little tubercle is seen to contain a spine shaped as represented in fig. 2, the angular shoulder being as sharp as a lancet. On the edge of the dewlap the spines are subulate, and not larger than the others, but they might be mistaken as shown in our figure for points of rays. The skin between the spines has a bluish gray colour after maceration in spirits. The dark markings existing in the specimen may be best learnt by consulting the figure. There is a faint appearance of bars on the caudal. Length,  $7\frac{1}{2}$  inches.

HAB. Port Jackson.

Among Dep. Assistant Commissary General Neill's drawings of King George's Sound fish, No. 51, having the native name of "Tabaduck," much resembles *M. granulatus* in profile, and also in the stellate point of the pelvic bone, nor does it differ much in the numbers of the rays, which are reckoned by Mr. Neill as follows: D. 1—28; A. 26; C. 12; P. 12. It is tinted of a mountain-green colour, with the top of the head darker, and the caudal almost blackish green, especially near its extremity, but no spots are indicated nor is the roughness of the integument shown, yet I am inclined to attribute the absence of these, merely to want of finish in the drawing, and to consider the

*Tabaduck* of King George's Sound as the same species with *Monacanthus granulatus* of Sidney Cove.

The Bag Balistes of Latham may be intended for this species, but it is too rudely drawn for identification. It differs, also, in two short rays following the dorsal spine.

#### MONACANTHUS CHINENSIS. Osbeck, (*Balistes*).

RADI:—D. 1—32; A. 30; C. 12; P. 13.

*Balistes chinensis*, Osbeck, Voy. i. p. 177, Eng. tr.; Bl. 152, fig. 1; Schn. p. 468; *Mon. megalurus*, Richardson, Icon. Pisc. p. 5, pl. 1, fig. 3; Icon. Reeves, 89; Hardw. Catil. 31, et ab India, 28? Richardson, Ichth. of China, Report to B. Ass. in 1845, p. 201. Chinese name, *Hih pe yang*, "Black-skinned goat," (Birch); "Black-skinned sheep," (Reeves); *Hah pe yeang*, (Bridgman, Chrestomathy, 50).

Plate XL., fig. 3, natural size; 4 magnified.

A characteristic figure of this species is given by Bloch, and it is well described by Schneider, but we have thought it desirable to figure Sir James Ross's specimen, that naturalists may be enabled to judge of the identity of the Australian and Chinese fish, and also to have an opportunity of correcting an error, that I fell into, in describing Lieutenant Emery's drawings of Australian fish, when I named this *Monacanthus* as a new species. The proportions are not exactly kept in the drawing, and the caudal fin is much exaggerated in size, but the general profile leaves little doubt of Lieutenant Emery's having had a specimen of *M. chinensis* before him. The profile of the face in *chinensis* is concave, giving a more beaked form to the muzzle than in *granulatus*, and the dorsal line inclines upwards to the commencement of the second dorsal, which is the highest point of the back, from whence it descends in a slope to the tail. The ascending slope to which the anal is attached has a corresponding form and inclination. The dewlap is thin, with a membranous edge, which is supported by fine rays, mostly simple, but occasionally forked. The tips of many of these rays project beyond the margin of the membrane, which has a rounded outline. At the extremity of the pelvic bone there is a cylindrical process, ribbed and granulated on the surface, and armed at each end by about four small, acute spines. The membrane of the dewlap descends beyond this process. The height from the first dorsal to the lowest part of the dewlap is contained once and a half in the total length of the fish. The dorsal spine stands over the posterior half of the orbit, and is ribbed and granulated or hispid in front, and armed on each side behind, by a row of strong spines. The small trigger ray does not rise above the margin of the axillary pit of the spine. This pit is small, and becoming obsolete in the dried specimen, or being filled by membrane in the wet one, its existence is denied by Schneider. The lower end of the gill-opening is even with the upper edge of the base of the pectoral. The skin is thickly studded by acute spines, which curve backwards and spring from a swelling base. The curved and flexuose lateral line is marked by a series of geminate spines, as noticed by Schneider. There are six and sometimes more larger spines disposed in two rows on each side of the tail, which is also studded with small ones.



Mr. Emery's drawing is coloured chestnut-brown, with darker blotches of amber and minute specks of orange-brown. The dawlapp is surrounded by three rows of flax-flower blue dots, behind which are three rows of brown spots. The dorsal and anal have two orange-coloured stripes near their edges, two rows of pale dots beneath them, and three rows of brown spots towards the bases of the fins. On the caudal there are three blue stripes across the end of the fin, and four or five brown spotted bands between them and the base. In Mr. Reeves's figure of the Chinese fish, the colours and arrangement of the spots are similar, though not quite the same, and there is a difference in the rings of colour on the caudal. The extreme edge of this fin is yellow, then follow two brownish-black bands, next two orange-brown ones, then two black ones, succeeded again by two brown ones, and lastly two black ones which are on the base of the fin. The spots on the dorsal and anal are only partially shown.

HAB. Australian seas, Port Jackson, Houtman's Abrolhos, Chinese Sea, Canton, Indian Ocean.

MONACANTHUS RUDIS. Richardson.

RADII:—D. 2|—35; A. 34; C. 12; P. 14.

*M. rudis*, Richardson, Zool. Tr. iii. p. 166, An. 1841. Zool. Proceed. March 10th, 1840.

Plate XL, fig. 7, half the natural size; 6, magnified.

In describing this *Monacanthus* in the Zoological Transactions, I remarked its agreement in general aspect with G. Forster's figure of *Balistes scaber*, preserved in the Banksian Library, but I was deterred from referring it to that species, because the figure showed some spinous serratures behind the pelvic bone on the edge of the abdomen, which do not exist in the specimen of *rudis*, but now that I have had an opportunity of examining a greater number of Australian *Monacanthi*, I feel more inclined than before to consider *rudis* and *scaber* as one species. Forster's description is unfortunately mostly confined to generic characters, and gives little assistance in clearing up the matter. The only points of discrepancy that I can detect, are his stating *scaber* to be "beaked," which *rudis* can scarcely be said to be, and his describing the branchial opening as very small and situated above the pectoral fin, whereas in *rudis* the inferior end of the aperture descends lower in front of the base of the fin than in most of the Australian *Monacanthi* which we have seen. It ought to be stated in regard to this, that in figures 1 and 3 of Plate 40, the artist has brought the gill-openings further down than they actually are in the specimens. The differences I have indicated are too slight to form grounds for the establishment of a second species, but the evil of a superfluous name having been already perpetrated, I have allowed it to remain attached to a figure of the Van Diemen's Land *Monacanthus* until specimens from Queen Charlotte's Sound, New Zealand, of Forster's fish, shall place the necessity of merging *rudis* in the prior appellation of *scaber* beyond a doubt.

In *rudis*, the profile of the face is straight or very slightly convex. It reaches its summit at the dorsal spine, from whence the back is horizontal to the second dorsal, and then descends obliquely to the tail. The height measured from the point of the pelvic bone is contained twice and a half in the total length, and the thickness is equal to one-third of the height. The dorsal spine stands over the posterior half of the eye and above the gill-opening. It is rounded, tapering, and acute, with a groove behind, on each edge of which there is a row of spinous teeth inclined downwards; its sides are thickly studded with minute rounded tubercles, and on the front are two rows of larger, smooth tubercles resembling spines worn down. The trigger ray is very short and inconspicuous. The point of the pelvic bone is a small knob studded with obtuse grains; the integuments of the belly behind it, are lax enough to allow of a little play, but there is no thin dawlapp supported by rays as in *M. chinensis*. The rays of all the fins are rough at the base, but less so in the pectorals than in the others.

The whole of the integument is studded with short obtuse bristles (fig. 8), which, when examined by a lens, appear to be ranged on the sides in short, oblique rows, five or six in a row or scale, with a few solitary ones between. In some places these groups are more easily made out, owing to the intervals being wider; but round the eye, the gill-openings, and on the head generally, the bristles are shorter, more obtuse, and either solitary, or so closely set, that their distribution in separate groups or scales cannot be discerned. To the naked eye, the skin appears to be finely granulated.

The upper jaw is armed by ten broad chisel-shaped teeth, more or less acuminate, and the posterior one on each side having a thin rounded edge which overlaps the lower tooth opposed to it. On the under jaw the teeth have crescentic cutting edges, and are six in number. The central pair, both above and below, converge at their tips.

Forster mentions that *scaber* has eight teeth in each jaw, and he enumerates the fin rays as follows, D. 2|—34; A. 34; C. 12; P. 12. (Forster's Descript. An. p. 152).

We have no certain information respecting the colours of *rudis*, when recent.

Length of the specimen, 10 inches; height at the pelvis, 4.4 inches; vertebrae, 18.

HAB. Port Arthur, Van Diemen's Land.

Solander describes a New Zealand *Monacanthus* as follows. "*BALISTES SCABROSUS, cinereus pinnâ dorsali posteriori, pectoralibus et anali luteis immaculatis; pinnâ caudali cinereâ in medio e virescente flavescens. Pinnâ dorsalis antica 2-radiata, cinerea: radio postico minuto. Apertura branchiarum, pallidè violacea. Labium superius griseo-plumbeum. Dentium maxillarum apices fuscae. Habitat in oceano Australiæ prope Motuaru (Nova Zelandiæ)."* Solander MSS. p. 36. It is noted as the same with *Balistes unicornu totus e cinereo plumbeus, subitis pallidior sub-flavicans. Habitat in oceano prope Cap Kidnappers.*" Solander, MSS. p. 9. These colours agree with those of Forster's *B. scaber* as far as he has described them. There are no particulars of form recorded, by which we can identify Solander's fish with *M. rudis*.

MONACANTHUS VITTATUS. Solander, (*Balistes*).

RADI:—D. 2|—32; A. 31; C. 12; P. 13; V. 1.  
(Solander).

CH. SPEC. *M. cute tenuissimè scabrâ, capite longo obtuso, oculis supra pinnas pectoris; spinâ dorsi transversim ancipiti, lateribus retrorsum aculeatis; pinnis dorsi anique anticè acuminatis; corpore quadrivittato, vittis abescentibus.*

*Balistes vittatus*, Solander, Pisces Novæ Hollandiæ, MSS., p. 1; Icon. 48, Fish of King George's Sound, drawn by Dept. Assist. Comm. Gen. Neill, in Mus. Brit.

Various Australian *Balistidæ* were named by Solander, Forster, and others, but owing to the descriptions they have left being confined to colour or to the generic characters, the determination of the species they allude to is difficult. The figures we have given in the present fasciculus will facilitate this task to future ichthyologists, and as a further assistance, we subjoin Solander's account of a well-marked species, which is sketched in Mr. Neill's book.

"*Corpus ovato-lanceolatum, compressum, cute tenuissimè retrorsum scabrâ tectum. Totus piscis pallidè cinereus, vittis quatuor abescentibus: due infimæ obsolete. Caput longius quam in plurimis, obtusum, latere et infernè sordide lutescens. Anus valde magnus. Oculi supra pinnas pectorales. Iris alba. Pupilla nigra. Carina abdominis ad unum ducta, radio unico scabrisculo terminata. Pinna dorsalis prima e radio unico magno transversim ancipiti, lateribus retrorsum aculeatis, sesquialti (in pisce 18 unciarum) luteo et altero minuto albo, vix nisi oculis attentioribus perceptibili. Pinna dorsalis posterior lutea, pone medium, anticè altior. Pinne pectorales luteæ, parvæ obliquè ovate, sursum seu angulo superiori parim acuminato. Pinne ventrales e carinâ descriptâ abdomine vix coloratior. Pinna analis lutea, similis pinne dorsali secundâ. Pinna caudalis a basi extra medium cinerea, apice lutescens, truncata, radii extimi cæteris paulò longiores. Os parvum. Dentes radii acuti.*"

"*Vitta prima prope dorsum; secunda ab oculis ad initium caudæ paulò supra medium; tertia a pinnis pectoralibus infra medium ad finem caudæ ducta; quarta obsoleta in abdomine.*" (Solander, l. c.).

Mr. Neill's drawing exhibits the profile of the fish as a pretty regular ellipse, of which the vertical diameter is contained thrice and a half in the total length. The anterior apex is formed by the lower jaw and is acute, and the length of the head to the pectoral, equals the greatest height of the body. The dorsal spine is shorter than one-third of the height. The third white band is the broadest and brightest, and the fourth, agreeable to the description, is lost in the pale tint of the belly.

HAB. King George's Sound, rare. (Neill). *In sinu?* Novæ Hollandiæ, Aprilis 28th, 1770, (Solander).

## ALEUTERIUS PARAGAUDATUS. Richardson.

RADI:—B. 6; D. 2|—30 ad 34; A. 28 ad 32; C. 12;  
P. 10 ad 12.

*Aleuterius paragaudatus*, Richardson, Zool. Proceed. March 10th, 1840, Zool. Trans. iii. p. 172.

Plate XXXIX., fig. 1, natural size; 2—4, magnified.

This gaily ornamented *Aleuterius* is common in the harbours of Van Diemen's Land and the southern coasts of New South Wales up to Port Jackson. Its form is elliptic-oblong, the greatest height of the body being contained thrice and one-third in the total length; and the thickness being a fourth of the height. The mouth turns obliquely upwards, as is usual in the genus, the chin being more prominent than the upper jaw. The cutting edges of the teeth are even, not lunated. The dorsal spine stands over the hinder third of the orbit and the gill-opening; and when depressed, is received completely into the furrow behind it, which reaches only half way to the second dorsal. It is four-sided, tapering, and acute, and is armed by acute teeth on each angle. Figure 2 is an enlarged front view of the spine; 3 a posterior view; and 4 a lateral one. The whole body is densely covered with very short, acute bristles, springing from globular bases. They are invisible to the naked eye, and feel rough only when the finger is drawn forwards. The original tints of colour have been effaced by long maceration of the specimens in spirits, but the following markings remain. The general hue is olive-brown, becoming silvery towards the belly. A black streak runs from the eye along the side of the nose and encircles the mouth. A pale stripe commences further back on the lower jaw, and ascending to the lower third of the orbit, is continued from behind the eye to the middle of the flank where it terminates. It has a bluish silvery hue in spirits, and is edged above and below with black. A similar stripe rises close to the preceding one on the chin, and running backwards under the edge of the pectoral ends in a row of spots. Above it, is a broader stripe, retaining a yellowish tinge which may be traced over the pectoral and some way along the flank. These stripes vary slightly in their course in different specimens. Round greyish-blue, or pearly spots ornament all the body below the inferior stripe, also the tail as far forward as the middle of the dorsal and the side of the back to the front of that fin. These spots are elongated into short bars along the pelvic bone. In some specimens there are a few spots in the space, which is destitute of them in the specimen which is figured. A dark bar crosses the caudal near its end, and there are some dark blotches on the back under the second dorsal. These specimens vary in length from 5 to 6 inches. Vertebrae 20.

HAB. Port Arthur, Van Diemen's Land. Port Jackson, Australia.

ALUTERIUS MACULOSUS. Richardson.

RADI:—D. 2|—30 ad 34; A. 29 ad 32; C. 12;  
P. 10 ad 12.

*Aluterius maculosus*, Richardson, Zool. Proceed., March 10th, 1840.  
Zool. Trans. iii. p. 170.

Plate XXIX., fig. 5, natural size; 6, 7, magnified.

This *Aluterius* has a higher body than *paragaudatus*, and its face is slightly concave in profile, not flatly arched. The greatest height is nearly a third of the total length. The dorsal spine is similarly placed to that of *paragaudatus*, but is proportionally taller, and is somewhat curved at its base. It has, in like manner, four angles which are armed by rougher stronger teeth. Figure 6 is a lateral view of the spine, and 7 a front view, which does not differ from the posterior one. The dermal bristles resemble those of *paragaudatus*, and when examined through a lens, the integument between them is seen to be finely spotted.

The ground colour of the specimens in spirits is olive-brown, densely spotted, and clouded by darker tints. The under parts are more silvery, and the caudal fin is crossed by a bar near its end. Length, 4 or 5 inches.

HAB. Harbours of Van Diemen's Land and New South Wales.

Dep. Assist. Commissary General Neill has drawn a King George's Sound *Aluterius*, which we are inclined to consider as the same with *maculosus*, though, as occurs in some others of his sketches, the peculiar mottling of the body is omitted. It is number 15 of his collection, and is named "Candey" by the Aborigines, some of them calling it also "Tabaduck," which seems to be a generic appellation. He says that it inhabits deep water, where the bottom is rocky, and is good to eat.

ALUTERIUS VARIABILIS. Richardson.

RADI:—D. 2|—35; A. 33; P. 13; V. 0; C. 12, rounded.  
(Spec. Br. Mus.)

Icon. 31, Neill's drawings of King George's Sound Fishes in Brit. Mus. (unpublished). Native name, *Tabaduck*.

Plate LIII., figs. 1, 2 and 5, natural size; 3, 4, 6, 7, magnified.

Mr. Neill informs us that this fish is very common in deep water on the rocky coasts of King George's Sound, and is much esteemed by the Aborigines as an article of food. Like the *Aluterus*, it is infested by *Isopoda*, and Mr. Neill states that the fish, which is suffering from the attacks of that crustacean, are bright yellow on the lower parts, while the others are of a beautiful purple colour. The specimen figured by Mr. Neill has the yellow colour, and a large *Isopoda* has burrowed in the side of the belly near the vent.

The top of the back, the dorsal, and anal fins are mountain-green, the sides and belly are bright gamboge-yellow. There are eight or nine flax-flower streaks on the lower lip

and chin, one of them encircling the muzzle behind the lips; also five or six of the same tint on each side of the pelvic bone, the three lowest of which unite on the mesial line with the corresponding streaks of the opposite side. A blue stripe runs beneath the base of the second dorsal, and another extends from the anus to the caudal, running near the anal. The bases of the dorsal and anal are also marked by a row of blue spots. The rays of the caudal are yellowish, and the membrane between them is striped with blue. The fin is crossed by two black bars, one on the base of the rays, and the other which is broader near their extremities.

The specimen is nine inches long, including the caudal fin, and its height at the point of the pelvis exceeds a third of the length. Its profile is an irregular ellipse, obtuse before and more tapering behind, with the ventral curve more prominent than the dorsal one. The mouth is turned a little upwards, and the lips project somewhat, but the snout has not a beaked form. The facial line rises with a slight convexity at an angle of 40° to the dorsal spine, which stands over the posterior half of the orbit: from thence to the second dorsal, the outline of the back is horizontal. The eye, placed high on the cheek, is three diameters and a half of the orbit distant from the edge of the upper lip; and the oblique gill-opening commencing a diameter of the orbit lower down, and exactly beneath its hinder edge descends to opposite the middle of the pectoral, its length being equal to a diameter and a half of the orbit. The skin is studded every where with short, recurved subulate bristles, and when examined through a lens, it appears to be divided into narrow rhomboidal compartments or scales, each of them armed by, from one to four bristles united to one another at the base (fig. 4). On looking at the interior surface of the skin, the scales have the ordinary tiled appearance represented in figure 5. The point of the pelvic bone is a small, convex knob scarcely rising above the level of the surrounding skin, granulated on the disk; and armed by a circle of incumbent spines, (fig. 7, magnified). The side of the tail is armed by four short, lanceolate spines, disposed in two rows, and round their bases the fine bristles of the integument are a little longer and more slender than elsewhere. The dorsal spine is equal in height to the space between its base and the upper angle of the gill-opening. It is convex and granulated in front with two rows of blunt incumbent teeth, which become pungent at the tip only of the ray. Posteriorly the dorsal spine is flat, and furrowed with a row of strong, acute, reverted spinous teeth on each edge. The trigger ray is minute. The interval between the first and second dorsal fins is greater than the length of the dorsal spine. The rays of the dorsal, anal, and pectorals are compressed in one direction at the base, and in another towards their tips. They are rough on the lower third of their height, but not quite down to their bases, which are smooth. The caudal rays are rough to near their tips. The markings of the dried specimen are shown in the figure and are black, though many of the corresponding lines in Mr. Neill's drawing are light blue. The dark colour is more intense in the spines than in the subjacent skin of the part.

HAB. King George's Sound.

## ALEUTERIUS? BROWNII. Richardson.

RADI:—D. 2|—33; A. 30; C. 11; P. 11.  
(Bauer's drawing).

During Captain Flinder's voyage of discovery round Australia, Mr. Ferdinand Bauer made highly finished coloured drawings of fish which are now in the possession of Dr. Robert Brown, and which this gentleman has kindly permitted me repeatedly to examine. One of them represents a very handsome species, having entirely the aspect of a *Monacanthus*, except that there is no indication of the protrusion of the point of the pelvic bone through the integument. In *Monacanthus variabilis* described above, the rough point of the pelvic bone might, by a less correct observer than Mr. Bauer, have been overlooked, as being merely a part of the common scabrous surface, it is conceivable that this point may be even less perceptible in other species, and some doubt must therefore exist, until the fish be again discovered, as to whether it ought to be considered as a *Monacanthus*, having a minute tip to the pelvic bone, or an *Aleuterius*, with the coarse coat and external aspect of a *Monacanthus*. The specific name is intended as a small tribute of respect to the distinguished naturalist, who laid the foundation of his fame by his researches on the voyage on which this fish was discovered.

The drawing is  $12\frac{1}{2}$  inches long, and represents an oval fish, blunt in front without any projecting snout, and the height contained rather more than thrice in the total length, caudal included. The integuments are covered with lanceolate, apiculate spines or bristles, mixed with much more minute asperities represented in a magnified drawing of a portion of the skin. The sides of the tail are also armed by four long, curved, cylindrical spines, placed one pair over the other. The teeth, similar to those of *Monacanthus*, are more conical and acute than usual, with deep notches between the cusps. The dorsal spine is toothed behind and before; the anterior teeth ranged in two rows, being shorter than those which arm the hinder edges of the spine. The gill opening is oblique, and is eight-tenths of an inch long.

The ground tint of the fish is pistachio, or sap-green, and azure-blue dots are scattered over the whole body. The spots are replaced by blue lines on the top of the back anteriorly, round the mouth, between the pectorals, on the temples and under part of the cheek. The scaly fillets along the bases of the dorsal and anal are blue, and there is a blue line near to the anal, parallel to its base. Six short blue bars radiate from the eye, and the nasal region is spotted with blue. The side of the tail is a bright saffron-yellow, shading off towards its middle into a rich orange-brown. The four lateral spines of the tail are placed in this orange patch, each having a green circle round its base. The anal and dorsal fins and the rays of the caudal are sap-green. The iris is prussian-blue, encircled by yellow.

HAB. Coasts of Australia.

## ALEUTERIUS TROSSULUS. Richardson.

RADI:—D. 1|—28; A. 26; C. 12; P. 11.

Plate XL., fig. 5, natural size; 6, magnified.

This fish has the aspect of a *Monacanthus*, but if the total concealment of the pelvic bone by the integuments without any vestige of a protruding point be held, with Cuvier, as the essential character of *Aleuterius*, it must be ranked in this genus.

It differs from the known species of *Aleuterius* in the high and short form of the body. The highest part of the profile is at the commencement of the second dorsal, from whence it descends to the mouth, with a curvature resembling the italic *f* reversed. The abdomen hangs down like a dewlap, but it is filled to the lowest point with the intestines, and has no thin membranous edge, being as thick before the anus as the back is. The height from the second dorsal to the point of the pelvic bone is equal to the length from the mouth to the tail. The dorsal spine stands over the middle of the orbit, and is roundish, with the tips scarcely pungent. Its height is not above one-fourth of the extreme height of the body, and it is densely covered with minute grains, which lengthen into very fine acicular bristles near the membrane. There is no vestige of a trigger ray to be detected externally. Both the dorsal spine and pelvic bone are flexible in our specimen. The gill-opening is exactly over the base of the pectoral. The skin is densely covered with slender, flexible, acute bristles, (fig. 6) which are so delicate as to give a velvety feel to the finger. The colour of the specimen, which has been long in spirits, is blackish-green, with some minute darker specks and dots of a pale colour scattered over the body, and most crowded on the face and flanks. Along the pelvic bone, and near the belly the dots run into streaks. The rays of the caudal are also speckled with black, the other colours are effaced. Length of specimen,  $2\frac{1}{4}$  inches.

HAB. Sea-coasts of Western Australia.

## ALEUTERIUS? BAUERI. Richardson.

RADI:—D. 1|—26 vel 27; A. 21; C. 9; P. 6 vel 7.  
(Bauer's drawing).

This species is named in honour of Mr. Ferdinand Bauer, being founded on one of his admirable drawings in Dr. Brown's possession. The figure presents the careful execution and felicity of touch which characterize Mr. Bauer's pencil, and looking to his known scrupulous accuracy in details, it may be considered as the representation of a generic form not yet described, in which the characters of several groups of *Plectognathi* are combined. It exhibits the undivided dental plate of *Diodon*, the inflated body and dermal spines of *Tetrodon*, and the fins of *Aleuterius*. We shall not venture upon the formation of a new generic name without having seen a specimen of the fish, and it is therefore placed provisionally in *Aleuterius*, with which, on the whole, it best agrees.



Two magnified views of the jaws are sketched in outline on a separate piece of paper, in which each jaw is represented as forming only one piece, as in *Diodon*, but the cutting edge instead of being even or only slightly crenated, is deeply notched, producing conical cusps resembling those of the *Balistidae*. Two rounded notches in the upper jaw form one mesial cusp, and an angular point on each side. On the lower jaw there are three conical cusps, slightly blunted. The body is inflated like that of one of the most distensible *Tetrodontes*, and the snout is short and slender. The belly is rounded and prominent, without any indication of a pelvic keel or projecting point of the bone. The dorsal spine stands as is usual in *Aleuterius* over the orbit, and has the common triangular slip of membrane behind it. The second dorsal and anal fins are highest anteriorly, but with rounded summits, and terminate so as to leave a rather slender trunk of the tail between them and the caudal, which is convex at the end. The branchial opening is a little above the base of the pectoral. An enlarged view is given of the spines, which cover the body thickly, in which they are represented as having semi-lanceolate bases with slender hair-like tips, and as being closely tiled on each other in a quincuncial manner. The length of the figure is 4 inches, and the height of the body  $2\frac{1}{2}$  inches.

The ground colour is emerald-green or bright grass-green, which is traversed longitudinally by seven interrupted dark brown stripes, two of which unite anteriorly; nine short bars radiate from all sides of the orbit, and on the belly and flanks beneath the lowest lateral stripe there are many white specks. The rays of the caudal are grass-green, spotted in cross rows with amber-brown; the pectorals have a neutral tint. The dorsal and anal are yellow, with three rows of black specks between the bases of the rays, and four rows of pale specks disposed in pairs between the tips of the rays.

HAB. Coast of Australia.

SCARUS ACROPTILUS. Richardson.

RADI:—D. 24; A. 13; C. 12. (Bauer's drawing).

For the knowledge of this very handsome fish we are indebted to the pencil of Mr. Bauer, not having seen any account of it in the ichthyological works we have consulted. It differs from other *Scari*, in the first three rays of the dorsal being higher than the rest, and the second ray taller than the other two. The rays of the dorsal and anal are also more numerous than in the other *Scari*, and they are all represented as tapering to a point, no distinction being shown between the spinous and articulated rays, the thickness of the membrane probably having prevented the difference from being evident. The last rays of both fins are divided to the base. The jaws have the usual form of *Scarus*, with a slight, irregular crenature on the edge and without any spinous or tiled teeth.

The body has a very regular elliptic form, its height being contained thrice and one-third in the length, caudal

included. The upper and under profile of the head are alike and enter regularly into the curves of the ellipse, the head being moderately blunt.

The ground colour of the body is green, with two rows of oblong purplish black blotches forming interrupted bars on the sides. The cheek is lilac, and a stripe of the same hue, with yellow and blue edges, passes over the gill-cover. Three azure stripes cross the temples. The under jaw is yellow, with a broad black mark which extends under the green pectoral. The dorsal is orange-yellow, traversed by a lake-red stripe with carmine edges, the extreme edge of the fin being green; an oval bluish black spot reaches from the third to the sixth ray. The ventrals are yellow, with green rays, and have each a large violaceous mark with blue edges in the centre. The anal is green at the base, then yellow traversed by a red stripe and marked by oblique lake bars near the edge, which is yellow. The caudal, which is even or slightly convex at the end, has a lake-coloured membrane marked with red bars or spots and green rays. The eye is green, with a black pupil and yellow iris.

HAB. Coasts of Australia.

CRENIDENS TEPHREOPS. Richardson.

RADI:—B. 6; D. 14|13; A. 3|11; C. 15 $\frac{1}{2}$ ; P. 17; V. 1|3.

*Kouelany*, Aboriginal appellation at King George's Sound. Icon. Drawings of Fish of King George's Sound, by D. Assist. Comm. Gen. Neill, in Br. Mus. No. 10. Drawing 10 $\frac{1}{2}$  inches long.

Plate XLI, fig. 1, half natural size; 2, magnified.

One member of this genus (*Cr. triglyphus*), has been already described at page 36, and represented on plate 35, fig. 2. The species now under consideration, has less of the physiognomy of *Cr. forskalii*, and more resembles the *Melanichthys* of the 'Fauna Japonica' (tab. 39),\* which does not appear to me to be a distinct generic form from *Crenidens*. *Cr. tephreops* is stated by Mr. Neill to be an inhabitant of rocky places in King George's Sound, where it is occasionally taken by the hook. Our figure and the following description are executed from a dried specimen, which is 11 inches long.

Form elliptical, with the profile of the face arched and gibbous before the nostrils. The head forms one quarter of the length, excluding the caudal, and is equal to three diameters and a quarter of the round bony orbit. The eye, placed near the profile, is equi-distant from the upper lip and tip of the gill-cover. The nostrils are pierced immediately before the anterior angle of the orbit. The cleft of the mouth, which is moderately wide transversely and arched, does not reach so far back as the nostrils. When viewed in front, the upper jaw has somewhat of a horse-shoe form, which is imparted to it by a forward curvature of the limbs of the intermaxillaries. These bones are tolerably stout and convex at the symphysis, and their tips move on the outside of the post-mandibulars, completely

\* *Crenidens melanichthys*, Richardson on the Ichth. of the Seas of China and Japan, Report of Brit. Assoc. for 1845, p. 243.

excluding the maxillaries from any share in the composition of the mouth. Their pedicles are about half as long as the limbs, but give sufficient protractility to the jaw to produce a deep, narrow furrow betwixt it and the preorbitar. In the bottom of this furrow is the maxillary, which glides in part under the edge of the preorbitar and cheek, and is completely shut in and concealed when the jaw is retracted. The intermaxillaries, up to their extreme tips, and the lower jaw, are armed on their edges by a single series of vertical, incurved, chisel-shaped teeth, with rounded tricuspid points, the side cusps being smaller, and considerably shorter than the middle one. Twenty-one or twenty-two of these teeth belong to each intermaxillary, and a smaller number to the opposing limbs of the lower jaw. The side cusps of the teeth implanted in the extremities of the intermaxillaries are obsolete. Separated from the outer row by a narrow furrow or interval, is a dense brush-like band on each jaw, composed of teeth of similar form, but much finer and shorter. The vomer and palate bone are toothless. *Cr. forskalii* has five cusps to the teeth, and in *triglyphus* and *melanichthys*, which have tricuspid teeth, the cusps are equal.

In *tephreops* the length of the preorbitar is equal to the diameter of the bony orbit, its height is one-third less, and its surface is scaleless; as are also the circumference of the orbit and the top of the head back to the posterior third of the orbits. In the dried specimen the skin of these parts and of the lips and lower jaw is crowded with minute pits. The cheek is entirely covered with scales, which spread over the temples and upper quarter of the gill-cover; the remaining part of the gill-cover, the interoperculum, and disk of the preoperculum are covered with smooth skin. Nearly the same distribution of scales on the head occurs in *Cr. triglyphus*, but in the figure of *melanichthys* in plate 39 of the 'Fauna Japonica,' the upper limb of the preoperculum and the whole operculum are represented as scaly. In *tephreops* the disk of the preoperculum is wide and rounded at the angle, and becomes gradually narrow as it ascends the upper limb. It is crenated on the edge, and in the dried specimen presents an uneven surface. The interoperculum and suboperculum are entire and even, and the operculum is cut by a shallow lunate notch, having a rounded upper corner and more acute inferior one. A smooth membrane fills up the notch and forms a narrow edging to the bone.

The scales are small and oblong, with parallel sides, truncated bases, and rounded ciliated extremities. An oblong central portion of the disk is smooth, the lines of structure are parallel to the sides, about thirteen furrows impress the base, and a small part of the tip adjoining the marginal teeth is rough. The number of scales in a row between the gill-opening and caudal fin is about 116, but their exact number could not be determined owing to the specimen having been varnished. Minute, closely appressed scales cover the membranes of the vertical fins almost to their extreme edges, a triangular slip behind the tip of each of the dorsal spines being the only smooth part. The spinous dorsal of *triglyphus* has merely a small fillet of scales before the spines on alternate sides of the membrane. In *melanichthys* the scales generally are much larger.

The dorsal of *tephreops* commences over the axilla of the pectorals, opposite to the ventrals, and occupies most of the back. Its anterior spines are graduated, the first being half as high as the seventh; the remaining seven are equal in height to each other and to the soft part of the fin, which is rounded posteriorly. The anal differs from that of *melanichthys*, in being somewhat pointed and highest in its anterior third, while the posterior part is rounded like the end of the dorsal. Its spines are slender, and the third one is considerably taller than the second, being equal to half the length of the longest soft ray. The second anal spine of *Cr. triglyphus* is rather taller than the third one. The caudal of *tephreops* is lunate at the end with acute tips.

Mr. Neill's drawing is black, deeper on the back and fins, and more dilute towards the belly. A very dark speck is placed behind the tip of the last dorsal spine. The eye is stated to be gray, and it is on this account that we have given the species the name of *tephreops*, as the others have for the most part green or blue eyes.

HAB. King George's Sound, Australia.

*Crenidens zebra* is another species named by the Aborigines *Kgunnual* or *Karraway*, "The Striped," and by the sealers the "Zebra-fish." It differs from *tephreops*, in having nine blackish brown bars descending from the back, and tapering off to a point on the whitish belly. The foremost stripe descends behind the pectorals, and the last one crosses the trunk of the tail. The anal is not peaked anteriorly, and the three spines of that fin are nearly equal in length to the soft rays. A single scale attached to Mr. Neill's drawing of this fish (number 8), is even smaller than the scales in general of *tephreops*, and has a narrower rounded base, but is otherwise similar. The drawing is nearly a foot long. Mr. Neill reckons the rays as follow: D. 11|15; A. 8|11; V. 1|5. He also states that the fish has a bluish gray eye, that it inhabits rocky places, is a gross feeder, and bad eating. It takes a baited hook.

#### SEBASTES PANDUS. Richardson.

RADII:—B. 6; D. 12|—1|8; A. 8|5; C. 13½; P. 16 et IV; V. 1|5.

*Scorpena panda*, Richardson, Annals and Mag. of Nat. Hist. ix. p. 216. An. 1842. *Tytluck* or *Teluck*, "Big-head," Native Australian names. Icon. Drawings of the Fish of King George's Sound, by Deputy Asst. Comm. Gen. Neill, No. 53. Br. Mus. Length of drawing, 13 inches. Length of specimen 13 inches.

Plate XLI., figs. 3, 4, natural size.

This species was first described in the Annals of Natural History, quoted above, from a drawing of the recent fish made at Houtman's Abrolhos, by Lieut. Emery of the Royal Navy. The transverse depression of the skull behind the orbits is somewhat exaggerated in his figure, but it is, nevertheless, deep enough to make the appellation of *pandus* appropriate. In this character it resembles the *Scorpena nova guineae*, but it differs from that fish in the absence of cutaneous filaments on the head and body,

the form of the spines of the head, the height of the dorsal spines, and in other characters. The existence of scales on almost all parts of the head is introduced into the 'Histoire des Poissons,' as one of the marks by which *Sebastes* may be distinguished from *Scorpena*, but the figure of *S. novæ guineæ*, published in the 'Zoology of the Voyage of L'As-trolabe,' represents it as scaly round the eye, on the temples, gill-cover, the whole cheek, and the maxillary: the snout, lower jaw, and gill-membrane, being in fact the only naked parts. It would, therefore, appear that the presence of cutaneous filaments in *Scorpena* is the only character by which it is separated from *Sebastes*.

Our figure and the following description of *S. pandus* are dependant upon a single dried specimen which was prepared at King George's Sound, and corresponds closely with Mr. Neill's drawing which we have quoted. The length of the head is contained three times and nearly a half in the total length, caudal included. The back is moderately arched, and the tail is more slender than is usual in the genus. The edge of the orbit rises boldly above the profile, producing a deep, acute furrow on the summit of the cranium, (fig. 4). The usual intraorbital ridges are quite obsolete, and the orbital plates are scaly. One small tooth exists on the anterior quarter of the edge of the orbit, and four on the posterior quarter. They are much less prominent and acute than the corresponding teeth of *S. novæ guineæ*. The diameter of the orbit is equal to one-third of the length of the head. A deep, rounded, transverse furrow separates the orbits from the supra-scapular region. The bony projections on the head generally, are short thin crests ending in a posterior corner, more or less acute, not in rounded spinous points. Such is the character of the short nasal points. The preorbit has four acute teeth on its under edge, the first being higher up than the other three; its upper edge is thin, elevated and undulating. The suborbital ridge which crosses the cheek close to the orbit has four thin crest-like prominences; this ridge abuts against the preoperculum high on the upper limb, and not as usual against the curve of the bone opposite to the principal spine. The disk of the preoperculum is granulated by little bony eminences, and there is a flat triangular projection at its angle, which is crested by two small spines, one incumbent on the other. Three acute spinous points exist on the lower limb of the bone, being fewer than usual. A thin ridge armed by two acute points crosses the middle of the operculum, and a flat spine terminates the upper curve of the bone, and overlies the base of the scaly tip of the gill-cover. The temporal groove is marked by two bony points at its anterior end, standing crossways, with their flat surfaces turned towards the orbit, and a short indented crest lying longitudinally a little farther back. The supra-scapular and scapular have each a thin crest similar to the temporal one. The maxillaries, preorbitals, snout, orbital plates, cheeks, preoperculum, interoperculum, and whole gill-cover, with the temples and nape are scaly. No vestiges of filaments can be detected on the head or body, nor are any represented in Mr. Neill's or Lieutenant Emery's drawings. The scales are ciliatodentate, and rough to the touch. About fifty-eight exist in a row between the scapular bone and caudal fin. The

lateral line is arched and acutely keeled, but not spinous at its commencement. It approaches close to the base of the fourth dorsal spine, but descends again opposite the tenth to the upper quarter of the height, and in the tail to a little above the middle. The keel is confined to the anterior arched part. The dorsal spines are tall, the third one being nearly equal in height to the body. The anterior ones have a considerable curvature. The spinous part of the fin is joined to the base of the spine of the soft part by membrane. The second anal spine is strong and fully a third longer than the following one, which is but a little taller than the first. The pectoral fin is large, its tip when laid back reaching to the middle of the anal. The pectoral of *Sc. novæ guineæ* falls short of the anus. The rays of the pectoral are more divided than usual, and even the inferior ones are split at the point. Judging solely from the dried specimen, it does not appear that more than four could have shown the thick, simple tips in the recent state which are common to the inferior pectoral rays of the *Scorpenæ* and *Sebastes*. There is little or no emargination of the membrane. The inferior rays of the gill-membrane are much concealed, so that only five are apparent. Fine villiform teeth arm the jaws and chevron of the vomer.

The markings which remain on the dried specimen have been transferred to the figure. In Mr. Neill's drawing, the lips, maxillary, ventral spines, and some spots on the anal are orange, and the pectoral region has a yellow hue. The dark parts are coloured with neutral tint, and the pale band which crosses the caudal is omitted. In Lieutenant Emery's figure, the head and body have a vermilion color, with a tapering, hyacinth-red band, descending from the spinous dorsal behind the pectoral, and a narrower one extending from the soft dorsal nearly to the anal. Round drops of dark orange-brown are spread regularly over the body but do not extend to the belly. Smaller drops of the same hue are scattered on the sides of the head, lower jaw and gill-membrane, being intermixed in the latter localities with whitish spots. All the fins except the ventrals and spinous dorsal are reddish brown, and are spotted like the body.

HAB. West coasts of Australia, King George's Sound. Houtman's Abrolhos.

LEPADOGASTER PUNICEUS. Richardson.

RADII:—D. 10; A. 4; C. 10½; P. 19 at IV; V.—

Plate XLIII, figs. 1—4, natural size; 5—7, magnified.

Body considerably arched, both transversely and in profile, flat underneath. A groove runs along the middle of the back from the hind head to the dorsal fin; the sides are strongly furrowed vertically from the contraction of the muscles, and on each side of the tail at the middle height there is a furrow at the insertion of the muscles. The snout is rather shorter and steeper in profile than the artist has shown it in figure 1; its length being somewhat less than the diameter of the orbit. The eyes are scarcely

a diameter apart, and as they are tumid, they interfere slightly with the arch of the profile. Viewed from above, the fish seems to be composed of the sections of two cones joined by their bases; the head being a shorter and wider one, with a truncated apex, and the body more slender and tapering acutely into the caudal fin. At the point of the gill-cover the height is one-fifth of the total length, and the width is rather less than twice the height, or it is contained twice and two-thirds in the total length, caudal included. The skin is quite smooth and scaleless, but when examined by a lens, it exhibits a minutely reticulated surface. There are a few scattered pores on the snout and temples. The nostrils are two small orifices with tumid lips, which swell into a little flap on one side of the anterior opening; the posterior aperture is contiguous to the eye. There are no furrows on the head. The orifice of the mouth is small, and placed beneath and slightly behind the extreme end of the snout; it is not cleft quite so far back as the fore part of the eye. The jaws are armed by truncated incisor teeth, four or five deep in front, but thinning off to a single row towards the angle of the mouth; the exterior ones are taller, and are ranged in an even, pectinated series, as represented in figures 4 and 5. Figure 6 shows the teeth of the lower jaw, in which the interior ones are more conspicuous than in the upper jaw. The suboperculum ends in an acute, spinous point, which is enveloped in soft integument. The form of the operculum does not show through the soft parts, and it has no prominent bony corners, but its soft membranous tip forms a kind of lid to the gill-opening, which is restricted below by an inward turn of the gill-membrane.

The sucking apparatus is divided into two concave disks by a deep, transverse depression. The anterior or pectoral disk is wider, has a semilunate shape, and is completed on the sides by four enlarged rays of the pectoral. The rest of the pectoral has a rounded outline, with fine rays, and the usual position of that fin. On the base of the fin, in the angle between its vertical and horizontal parts, there is a prominent and somewhat loose fleshy lobe. The posterior or ventral disk is transversely oval, and is surrounded by a membranous border, which is free throughout, and anteriorly overlies and conceals the depression behind the pectoral disk. No rays can be detected in this border, but its posterior half is furnished with a single row of flat eminences such as stud the surface of both disks. The ventrals are small, and applied to the sides behind the pectorals. Their rays are so fine that they can scarcely be perceived with the aid of a lens, through the thick membrane. The dorsal commences behind the anus, and its last ray is bound to the back by membrane throughout its length, but is not joined to the caudal. The anal is smaller, and reaches a little further back, but neither is it joined to the caudal. The front ray of both these fins is very slender and cannot be seen by the naked eye. The caudal is enlarged at the base by a narrow membranous edge, which embraces the end of the tail, and approaches close to the dorsal and anal. Three short rays in this membrane above, and as many below, are as fine as hairs. The anus is as nearly as possible in the middle of the total length, and behind it there is a small

genital papilla on the verge of another opening. The colour of the specimen, after long maceration in spirits, is a pure red, very pale on some parts, and more intense in others. There is a mottling of darker red patches on the back, but it is not easy to determine whether it be caused by original markings, or be merely the remains of the general tint which has faded less on those spots. The eye is a bright carmine. Length  $2\frac{1}{2}$  inches.

HAB. New Zealand, where it was detected by Dr. Hooker.

#### MACHERIUM SUBDUCENS. Richardson.

RADI:—B. 6; D. 72; A. 60; C. 9; P. 10; V. 0.

*Macherium subducens*, Richardson, Annals and Mag. of Nat. Hist. for September, 1843, xii. p. 175, pl. 6.

Plate XLIV., figs. 1—4, natural size; 5, 6, magnified.

This fish was originally described from a dried specimen in the work above quoted, and the figure being indifferent, another is now given of a specimen which has been kept in spirits, and has lost much of its original colour. We shall transcribe the general characters of the fish as recorded in that work, making such slight alterations and additions as we are enabled to do from the more perfect state of the specimens now before us.

CH. GEN. *Piscis malacopterygius, apodus, ensiformis, squamosus. Caput antice compressum. Os modicè extensum. Labia ampla, tumida. Dentes parvi, uniseriales, pectinati, incisores in acuta acie intermaxillarum maxillæque inferioris ordinati. Dentes pharyngei acerosi, stipati. Apertura branchialis satis magna. Radii branchiostegæ teretes membranam largiæsculam sustentantes. Genæ et regiones suprascapulares squamose. Pinne verticales coactæ, spinis nullis. Pinna dorsi per maximam dorso partem regnans. Anus ante medium piscem. Linea lateralis brevis ante anum desinens. Squamæ cycloideæ parvæ.*

Form elongated and compressed, like that of a *Gunnel-lus* or *Ophidium*, and similar to a straight sword or butcher's knife, whence its generic appellation. The height of the body is one-tenth of the total length, and its thickness one-fiftieth. The compression is much greater behind the anus, and augments up to the tip of the tail, which is not acute. The head, which forms a seventh of the total length, is also compressed, especially before the eyes, the snout being acute when viewed from above but the swelling of the lips renders it less sharp than it would otherwise be. The cranium is rounded and smooth traversely, but appears straight and horizontal in profile up to the eye, and a little concave in front of it. The eye, moderately large, is near the profile, and is one diameter of the orbit nearer to the tip of the snout than to the posterior edge of the gill-opening. The nostrils lie immediately before it, the hinder opening being larger than the anterior one. The cleft of the mouth descends obliquely as it runs backwards, and does not reach to the fore edge of the orbit. The intermaxillaries and lower jaw having their edges, which are



very acute, set with a single, compact, even series of compressed cutting teeth, of which there are about forty-six on each limb of each jaw, and though they are sufficiently compressed to give them an incisorial character, their tips are a little rounded. The jaws, of equal length, have internal semi-elliptical areas, which are bounded by the teeth. The chevron of the vomer, rather prominent, acute-edged, and having a concave disk, is perfectly toothless, and the palate bones are also smooth. Two pharyngeal bones on each side above the gullet are densely crowded with short, conical, acute teeth, the outer row on each bone being taller than the rest of the dental surface. No teeth were detected on the lower union of the branchial arches. Each of the four arches is furnished with two rows of rather widely set, subulate, soft, cartilaginous processes, but with no rigid teeth. The tongue, narrow, long and free, has a dilated, spoon-shaped tip, formed by thin, membranous edges.

Both jaws have a broad, crescentic velum, and the exterior lips above and below are much developed. The horizontal extent of the upper lip when expanded is shown, but not fully, by dotted lines in figure 2. The exact form of the lip in this position is truncated on a line with the apex of the intermaxillaries, where it is broadest, and from thence it gradually narrows to the angle of the mouth, its outline being triangular. The under lips are similar in form and extent; and both fold back above and below on their respective jaws. The intermaxillary pedicles equal the dental limb of the bone in length, and reach back over the centre of the orbit, but are not retractile beyond one-third of their length. The maxillary bone forms no part of the circumference of the mouth, though its lower end descends a little below the angle of the mouth, passing close to it. The articulation of the lower jaw is far back, posterior to the eye and contiguous to the lower end of the preoperculum. The very narrow suborbital chain is perforated by a row of small pores, which reaches from the nostrils round two-thirds of the orbit to the temples. The large cheek is covered with small oblong tiled scales, eleven or twelve rows in height; the scaly surface being bounded posteriorly by the moderately curved, narrow, smooth disk of the preoperculum. This bone inclines but slightly forward as it descends, and its upper end is separated from the orbit by a scaly space equal to the height of the cheek. The interoperculum lies wholly behind the preoperculum, and the projecting heel of the lower jaw moves against its inferior angle. The operculum having an area scarcely equal to that of the interoperculum, is triangular, its posterior angle being acute, but not pungent. It is equalled in size by the suboperculum, which has a curved edge, and gives a blunt form to the gill-flap. All the gill-pieces are covered with smooth skin, as is also the top of the head backwards to the occiput, the only scaly parts being the cheek and supra-scapular region. The gill-openings do not reach above the point of the operculum, and curve a little forwards as they descend to the isthmus. The gill-membranes are united to each other beneath, and are supported on each side by six cylindrical, slightly curved rays.

The scales of the body, elliptical or oval, are firmly im-

bedded in the skin, and present a roundish disk when *in situ*. There are about 200 in a longitudinal row, and between 40 and 50 in height. Their structure is cycloid. The lateral line runs backwards to beneath the tenth dorsal ray, where it terminates.\* It is composed of a transparent, small elevation or tube on each scale. The anus terminates the first third of the length of the fish.

Rays:—Br. 6; P. 10; D. 71; C. 10; A. 60. All the rays are articulated. In the specimen described in the 'Annals of Natural History' the caudal rays were more readily distinguished, owing to their shortness and slenderness, from the anal and dorsal, than in the specimen now before me, and each of these fins had a ray fewer, but there are no other characters which lead me to suppose that they are distinct species. Each vertical ray has a small fillet of scales in front, reaching about half-way up. Some of the anterior rays of the dorsal and anal are simple, though jointed, and all the rest are divided at the tips once or twice.

The intestinal canal, about four inches long, is a simple tube, with a single flexure. Its upper half is wider and more plaited and wrinkled interiorly; the under half becomes gradually more slender and also more delicate in its coats. There are no cæca and no air-bladder. The liver of the specimen which was opened had perished. Its stomach contained fragments of a small, scaly fish, nearly digested.

Length 11 inches. To anus 3·4 inch. To gill-opening 1·4 inch. To occiput 1·1 inch. Height of body 1·1 inch. The dried specimen figured in the 'Annals of Nat. History' measured nearly 14 inches. It was caught at Port Essington, where it is known to the aborigines by the name of "Ambeetunbeet."

HAB. Western and northern coasts of Australia.

OXYBELES. Richardson.

Two examples of a novel generic form of fish exist in Sir James Ross's collection. The place of their capture was not recorded, but judging from the species associated with them in the same jar, they would appear to have been obtained on the coast of Tasmania or of the more southern islands. The College of Surgeons received from Sir Everard Home, Bart., a third individual of the genus. It was vomited by a *Holothuria* that was dredged up at Copang, in the island of Timor. The following is a summary of the general features of the genus:—

*Piscis apodus, squamis carens.*

*Corpus compressum, pugioniforme, caudâ acutissimâ.*

*Cutis politus auro argenteoque hic illic reitens.*

*Anus gularis. Oculi majusculi.*

*Rictus oris satis amplus pone oculum fissus, terminalis, ex intermaxillis maxillæque inferiori constructus.*

*Dentes intermaxillares, maxillæ inferioris ossiumque palati acerosi, conferti; nonnulli canini. Dentes vomeris majores. Lingua laris.*

\* In the plate the line has been inadvertently indicated all the way down the side of the fish.

Membrana branchiostega aperturam amplam tegens, radiis septem sustentata.

Pinnæ ventris caudæ nulle. Pinnæ dorsi anique in apicem acutissimam caudæ coalitæ, radiis tenuissimis, setaceis, flexilibus sustentatæ.

Operculum osseum stellatum tripartitum, uno ramo erecto, altero descendenti, tertio postico, longiori, subulato, subspinoso, in pisce recenti celato. Cranium fornicatum, leve, sine caninis vel cristis. Vertebrae circiter centum, quarum novemdecim abdominales.

Ventriculus magnus, cæcatus. Intestinum bis propæ œsophagum flexum; cæcis pyloricis nullis. Vesicula aeris ampla, longè post anam extensa.

OXYBELES HOMEI. Richardson.

Plate XLIV., fig. 7—18.

RADI:—Br. 7; D. et A. non numerand. P. 19; C. 0.

The specific name is intended as a tribute of acknowledgement to the zeal of Sir Everard Home in collecting objects of Natural History on the coasts of China and Australia. When the specimens were cursorily examined before they were placed in the artist's hands to be drawn, they appeared to represent two species, differing in the relative thickness of the body, and in the commencement of the dorsal fin, but on a more careful inspection after due maceration in water, the characters of all three examples proved to be nearly identical, the dissimilarity having been caused by two of them being placed in strong spirits, whereby they had become shrivelled, and a fold of skin between the shoulders made to look like a forward prolongation of the dorsal fin. This is mentioned to account for two figures of the same species.

Body siletto-shaped, tapering, and becoming thinner gradually from the head to the acute point of the tail. Snout rounded obtusely; the profile from the eye to the shoulder slightly convex. Head thicker than the body, forming one-seventh of the total length of the fish. Mouth terminal, cleft beyond the eye, under jaw a little longer than the upper one. Upper half of the margin of the mouth formed by the long, slender, non-protractile intermaxillaries. The maxillary is also slender, but dilates gradually towards its tip, which passes behind the corner of the mouth. The teeth are minute, and are not readily seen without the aid of a good eye-glass. They are individually subulate, slightly recurved, and ranged in level, filiform bands on the intermaxillaries, lower jaw and edges of the palate-bones; the dental surfaces being narrower on the upper jaw, than on the under one or palate, where they stand in four or five rows. Near the symphysis on both jaws a few of the teeth are higher, and two or three of the anterior lateral ones in the lower jaw are tall enough to merit the appellation of canines. The conical knob of the vomer projects considerably, and is armed by a comparatively stout central tooth, with a ring of smaller ones surrounding its base. Tongue rather conical, smooth and rounded. Nostrils, two orifices with tumid lips piercing a soft membrane which occupies much of the space

between the eye and the obtuse end of the snout. Three pores stand in a transverse row between the fore parts of the orbits. Preoperculum marked by a groove, which crosses the top of the head, and is there perforated by three pores. Cranium rounded smoothly off on the sides. Gill-cover very porous, with an acute, soft tip, extending beyond the subulate tip of the tripartite bony operculum. Eye lateral, pretty large, bright and silvery. The gill-opening extending beneath as far forward as the preoperculum. The snout, operculum and cheek are minutely porous.

Lateral line a continuous ridge standing in a furrow, extending from the temporal groove to the tip of the tail, and running nearer to the back than to the belly. Skin of the body quite smooth. Anus situated before the pectoral fin, under the upper angle of the gill-opening. An acute seam or ridge runs forwards from it into the isthmus between the gills. M. Agassiz, to whom I showed the specimens, informed me that this was an indication of the individual's being young. Pectorals narrow and pointed, having a length equal to about one-tenth of the whole fish.

The anal is wider than the dorsal, but both are very low, and the rays cannot be very easily counted, owing to the thickness of the integument and the difficulty of keeping the fins extended. The fins meet in an acute point at the tip of the tail, but when they are examined through a good lens it may be seen that no rays emanate from the apex of the tail, those of the dorsal and anal converging beyond it, and leaving a minute, triangular membrane between. The rays are unbranched, tapering and flexible, with long joints towards their tips, which can be perceived only under a considerable magnifying power, and then each ray appears to have a midrib with a thin anterior and posterior edge. The anterior rays are not apparently different from the others, but I have been unable to ascertain clearly whether the joints are not quite obsolete in the rays of the fore part of the dorsal. The dorsal begins at less than a quarter of the length of the fish from the end of the snout; the anal commences close to the anus, and is consequently longer than the dorsal.

I dissected one of Sir James Ross's specimens, but the intestines were not in a very good condition for examination. The liver had perished. The peritoneum is thick, tough, and of a shining, silvery hue, with black, star-like specks. Œsophagus thin and membranous. Stomach a large, conical, cæcal sack, longitudinally plaited within, with the pylorus near the œsophagus, leaving most of the viscera beneath. Intestine delicate, forming two deep loops. No pyloric cæca were detected. A roundish and rather large spleen is attached to the posterior tip of the stomach, and lies dorsal of the remains of the liver. In this individual the air-bladder appeared to be a long tube, with alternate dilations and contractions, but in another specimen, which is somewhat diaphanous, a wider air-bladder can be seen running a good way behind the anus without any visible contractions. The vertebrae amount to 99, of which 19 have two inferior divergent processes, affording space for the viscera. The others have a single inferior and superior process, whose tips are much compressed and very thin.

Length of the fish  $4\frac{1}{2}$  inches. Length of head 0·65 inch. Distance between the tip of the snout and the anus 0·59. Distance between the tip of the snout and beginning of dorsal 1·05 inch.

HAB. Seas of Australia? and Timor.

#### GALAXIAS TRUTTACEUS. Cuvier.

*Galaxias truttaceus*, Cuv. Règne An. ii. p. 283. Cuv. et Val. Hist. des Poiss. xviii. p. 344, "t. 543."

RADI:—B. 9; D. 11; A. 15; C.  $16\frac{1}{2}$ ; P. 14; V. 7.

#### Plate XLII, figs. 1—6.

Since the plates for the present fasciculus were printed, the XVIIth volume of the *Histoire des Poissons* has appeared, containing a full description of this species, and rendering a detailed account of our specimens unnecessary. We have received this fish only from Van Diemen's Land, where it appears to abound. The individual figured in plate xlii. was taken in the Derwent River.

The body is flattened above, especially near the nape and on the sides, the width thinning off gradually to the tail, which is much compressed. The height of the body is contained six times and a half in the length, and the thickness at the shoulder is equal to four-fifths of the height. The head forms just a fifth of the whole length of the fish.

The gape of the mouth extends backwards to beneath the anterior quarter of the eye. Two-thirds of its upper border is formed by the premaxillaries\* which bear acicular teeth in one series, the tallest being at the beginning of the posterior third of the bone, or where it curves from the transverse to the longitudinal direction. The maxillary which completes the upper border of the mouth is without teeth. Each limb of the mandible is armed by about 12 teeth in one row, the pair next the symphysis and those near the middle of the bone being rather the tallest. The palatine teeth are more subulate, acute and recurved, and are ranged in a single straight row of seven on each bone, the rows receding slightly from each other as they run backwards. The tongue is armed by still stronger and more recurved teeth set round its edge in a semi-elliptical curve, the foremost tooth being the stoutest, the others diminishing gradually as they run backwards. There are five on each side of the tongue exclusive of the front one. The branchial arches are each armed with two rows of delicate, subulate, acute teeth.

The dorsal is as high but shorter than the anal, and begins before that fin, and consequently ends before it. The caudal is a little hollowed at the end, and at its base above and below there is an acute, membranous edge, supported by short rays.

General tint of the best preserved specimens in spirits a delicate wood-brown, approaching to yellowish gray,

paler on the ventral surface, with scattered, minute, black dots, and about seventeen vertical rows of dark-eyed spots, the size of a pin's head. These rows bend *en chevron* in the middle of the sides, and the three rows on the shoulder are replaced by bars. A series of faint, short, oblique bars is also formed on the belly and flanks by clusters of the finer points. The snout is blackish; there is an oblique bar on the cheek and a roundish mark on the operculum. The ends of the dorsal, anal and ventrals are blackish. The skin generally is smooth and polished, and the muscles show less distinctly on the flanks than in other species. The very oily flesh of this fish spoils rapidly, and most of the specimens we have seen are soft, and of a dark purplish red colour. The individuals we have received from the Derwent River are paler than those which have been sent to us from Port Arthur. Mr. Lemprière describes the latter as having, when recent, "a dark olive colour, with red spots, but some of a darker colour will weigh nine ounces, and are excellent for the table."

Length of our specimens about 4 inches.

HAB. Fresh waters of Van Diemen's Land. It is named locally "the trout."

#### GALAXIAS MACULATUS. Jenyns (*Mesites*).

*Mesites maculatus*, Jenyns, Zool. of Beagle, p. 119, Pl. 32, fig. 4.

*Galaxias truttaceus*, Règne An. edit. Crochard, Pl. 97, fig. 2.

*Galaxias maculatus*, Cuv. et Val. xviii. p. 355.

RADI:—D. 11; A. 14 ad 16; C.  $16\frac{1}{2}$ ; P. 11 ad 13; V. 7 (3 specimens).

#### Plate XLIII, figs. 14—17.

This species is remarkable for the smallness of its mouth, its short round pectorals, twice their own length distant from the ventrals, and for being considerably less flat or more rounded on the back than *truttaceus*, *brochus* or *reticulatus*. It is a slender fish when not distended with roe, but its shape alters towards the spawning season. The end of its intestinal canal protrudes from between the edges of a fissure in the belly, shown by the different texture of the parts, for the surface is continuous; a small opening succeeds it, to which, just before the anal fin, the end of the gut acts as a valve, closing it when the tail is depressed.

The general colour in spirits is pale yellowish or wood-brown, with many oblong and irregular spots formed by clusters of small purple dots, scattered over the back and sides. The top of the back is also generally sprinkled with these dots, and on the sides the ground colour is powdered with dots so minute as to be totally invisible to the unassisted eye. The under surface is spotless, and has very few dots. The head forms the seventh of the total length in two specimens, and is proportionally a little longer in the third. Anal larger than the dorsal. Teeth as represented in figures 16 and 17. In one specimen the anterior pair on the tongue are smaller than the next pair. The rows of palatine teeth are nearly straight and parallel. Length from  $3\frac{1}{2}$  to  $4\frac{1}{4}$  inches.

HAB. The Falklands. Patagonia.

\* Professor Owen's nomenclature of the bones is adopted in the following pages.

## GALAXIAS SCRIBA. Valenciennes.

*Galaxias scriba*, Cuv. et Val. Hist. des Poiss. xviii. p. 347.RADII:—D. 11; A. 17; C. 16  $\frac{1}{2}$ ; P. 12; V. 7.

A solitary specimen from the Derwent River seems to possess the characters ascribed to *scriba* in the '*Histoire des Poissons*.' It has the most elongated form of any species we have seen, its height being contained nine times and a half in its total length. The body is rounded on the sides as in *maculatus*, but is flatter on the back, and the dorsal groove is occupied by two rounded ridges or folds, which reach from the occiput to the dorsal fin. The mesial groove on the belly is also more distinctly seen, but a mesial ventral line is marked out in all the species, either by the greater thinness and transparency of the integuments, a fine furrow, or, as in *truttaceus*, by a series of minute, dark dots. The head is similar in form to that of *maculatus*, and forms less than a sixth of the whole length, caudal included. The mouth is scarcely so small as that of the species just named, and is consequently still larger than the mouth of *attenuatus*. The teeth are similar to those of *maculatus*, but the lingual ones are less stout in proportion to the size of the fish. Eye rather large.

The dorsal and anal commence opposite to each other, but the latter being larger, though not higher, extends further back; the caudal fin is forked at the end.

Colour a pale yellowish gray, powdered on the back and sides with minute purplish dots, which are individually imperceptible to the naked eye. Towards the tail, clusters of the same minute dots produce many faint, roundish spots above the lateral line. On the top of the back there are two or three groups of spots large enough to be visible to the naked eye, but not crowded so as to produce any definite spots. On the sides there are several arborescent lines of a purplish pigment, resembling fine vessels filled with dark venous blood, which, for the most part, but not always, issue from the lateral line, and follow the interstices of the muscular fasciculi. The under surface and the ventrals are pale or flesh-coloured, without markings, and the vertical fins are grayish, traces of a darker blotch existing on the base of the caudal. The top of the head and snout are dark. The oblique muscles of the sides show strongly through the skin. Length 6  $\frac{3}{4}$  inches.

HAB. Derwent River, Van Diemen's Land. Port Jackson, Australia.

## GALAXIAS BROCCBUS. Richardson.

RADII:—D. 11; A. 14; C. 16  $\frac{1}{2}$ ; P. 13; V. 7.

Plate XLIII., figs. 8—13.

Height of the body equal to about one-sixth of the length, caudal included, and the thickness to about the seventh. The back is wide, with an obtuse furrow, which extends backwards to the dorsal, gradually narrowing with the decreasing width. The head forms one-fifth of the

length; the snout is broad and the gape is large, extending to beneath the middle of the eye.

The jaw-teeth are mostly acicular, the posterior ones on the premaxillaries being small, and one or two near the symphysis with four or five towards the middle of the bone more subulate and rather taller. Four or five in the lateral curve of the mandible are taller, subulate and recurved, and the three anterior pairs on the tongue are more approximated and much stouter than the posterior ones (figs. 12, 13). There are nine on each side of the tongue, all more or less recurved. The palatine teeth stand in a curved line, which recedes from its fellow posteriorly (fig. 10).

Pectoral fin much rounded. First ray of the ventral, which is also rounded, opposite to the middle point between the end of the snout and base of the middle caudal rays. Vertical fins rounded. Anal deeper and longer than the dorsal, commencing opposite to its fore-quarter, and extending farther back than its termination.

The skin of this fish is smooth, and permits the strongly-marked muscular fasciculi to be seen through it. Its colours appear to have altered in spirits, the general hue of the upper parts especially being a dingy brown, with some ill-defined specks scattered over it. The sides are marked by a series of seven pale, compressed and irregular rings. The fins are obscurely spotted and clouded, and the borders of the dorsal and anal and the whole caudal are dark.

Length 8  $\frac{1}{2}$  inches. Only two individuals exist in the collection, the smaller one measuring 4  $\frac{1}{2}$  inches in length.

HAB. Auckland Islands.

## GALAXIAS RETICULATUS. Richardson.

RADII:—D. 12; A. 15; C. 16  $\frac{1}{2}$ ; P. 13; V. 7.

Plate XLII., figs. 7—12.

This species has much resemblance to *broccbus*, being very similar in its general form and in its dentition. Its snout, however, is more rounded, and its head proportionally, somewhat larger. The pectoral fin is also shorter, and the gape of the mouth a very little smaller.

Three or four of the lateral premaxillary teeth are more perceptibly taller than the rest, while those in the corresponding part of the lower jaw are less stout and tall than in the *broccbus*. The palatine teeth are similarly arranged, as are also the teeth on the tongue, but the passage is more gradual in size from the anterior to the posterior ones. The vertical fins are scarcely so much rounded as in *broccbus*, but are similar in position and relative extent. They are paler, and with the ventrals, are covered with more numerous, smaller and better defined specks. The upper parts and sides of the fish are blackish green, reticulated by white lines, the meshes anteriorly being oblong and high, and more wide and angular posteriorly. A blue mark crosses the lower part of the shoulder to the axilla of the pectoral fin, which is not perceptible in *broccbus*, but a similar mark exists in *fasciatus*. The whole skin is rough with innumerable small, pouting



pores, in which it differs from *broechus*. The specimen figured rather exceeds six inches in length, but there are others somewhat larger, and one only about half the size.

HAB. Auckland Islands.

#### GALAXIAS FASCIATUS. Gray.

*Galaxias fasciatus*, Gray, Dieffenbach's New Zealand, Append. p. 219. An. 1842. Cuv. et Val. xviii. p. 350. An. 1846.

This species was described briefly by Mr. Gray, in the work above quoted, and subsequently in the '*Histoire des Poissons*,' mentioned under the same specific designation, though M. Valenciennes does not seem to have been at all aware of Mr. Gray's prior notice of the species.

HAB. River Thames. Bay of Islands.

#### GALAXIAS ALEPIDOTUS. Forster (*Esox*).

*Esox alepidotus*, J. R. Forster, MSS. 11, 62, apud Bl. Schn. p. 385, An. 1801; Descript. Anim. curâ Lichtent. p. 142, An. 1844; G. Forster, fig. pict. 2, t. 235 in Bib. Banks.

*Galaxias alepidotus*, Cuv. Reg. An. 2, p. 283; Richardson, Dieffenb. New Zealand, App. p. 219, An. 1842.

*Galaxias forsteri*, Cuv. et Val. xviii. p. 351, 1847.

This fish being an inhabitant of Dusky Bay, in the southern part of New Zealand, which is seldom visited, does not appear to have been brought to Europe since Forster's time. The figure represents a fish having the general form of *G. reticulatus*, but differing in its markings. The ground tint of the drawing is greenish black, with wavy spots of various sizes, none of them large. They are most numerous, rounder and smaller on the tail; congregated, lumate and irregular on the flanks; rounder again on the shoulder, and one of them over the pectoral forms a ring, with a spot in the centre. A few small, round spots exist on the side of the head and base of the dorsal. All beneath the spots which do not reach the belly is whitish. The spots are yellow and the ventral fins blackish. The second dorsal is high, commences before the anal, but does not reach nearly so far back.

Length 9 inches.

HAB. Dusky Bay, New Zealand. Named "He-para" by the natives, and "Rock-trout" by Cook's sailors.

#### ATHERINA NIGRICANS. Richardson.

RADI:—Br. 5½; D. 7—1½; A. 1½; C. 17; P. 15; V. 1½.

#### Plate XLII, figs. 13—18.

This is an elongated species, the height of the body, which is greatest near the ventrals, being contained about eight times in the total length, while the thickness considerably exceeds half the height. Head forming rather more than a sixth of the total length, slightly convex in profile and also transversely. Mouth small, the gape scarcely reaching half-way to the eye. Jaws equal. Pre-maxillaries moderately protractile, the maxillary remaining near the edge of the preorbital, but in no way con-

cealed by it. This bone is straight and slightly dilated towards its lower end, which plays over the limb of the lower jaw. The appearance of curvature given to it in figure 14 is caused by the projection of the snout or posterior lip at its head and an edging of membrane at its tip. It is, however, rather pointed than truncated at the end, but differs widely in its shape from the maxilla of *A. hepsetus*. The side of the head is densely scaly up to the margin of the gill-opening, the snout, jaws and gill-membrane being scaleless. Rows of pores run along the edge of the preorbital, the lower jaw, under limb of the preoperculum and immediately beneath the orbit.

The upper and under jaws are armed with plates of short, villiform teeth, visible to the naked eye; the whole surface of the tongue is densely rough with still shorter teeth, but the roof of the mouth is toothless. I could detect only five rays in the gill-membrane, but it is possible that a minute, interior one may have escaped me. The pectoral is attached about the middle of the height, and equals a sixth of the length of the fish. The first dorsal is small, being only half the height of the body, and its last ray stands about midway between the tip of the snout and end of the caudal fin. Its first ray is opposed to the ventrals. The second dorsal begins a short way behind the middle of the fish, caudal included, and its first ray is short and flexible, the others being jointed and branched. The anal is longer and deeper than the second dorsal, reaching rather farther back and beginning before it and not far from the anus by a short, flexible, simple ray. The ventrals are small, with a pointed, scaly fillet between and above them. They are attached not far from the commencement of the second third of the fish. The caudal is excavated at the end, and consists of seventeen rays, with an acute, membranous edge at the base above and below, supported by several short rays.

There are about eighty-eight scales in a row, between the gill-opening and caudal; the individual scales are vertically and obtusely oval, with a rounded lobe forming the apex of the free edge. The covered part is marked by coarse lines of structure, with no radiating furrows, and having entire edges.

The general colour is a smoky black, with a silvery stripe along the middle, and the nacre of the scales shining partially through the black elsewhere.

Length 7 inches.

HAB. The Falkland Islands.

#### DAJAS FORSTERI.

*Mugil albulus*, J. R. Forster, Descript. Anim. curâ Lichtent. p. 145. Icon. pict. G. R. Forster, Bibl. Banks. No. 237.

*Mugil forsteri*, Cuv. et Val.

RADI:—B. 6; D. 4—1½; A. 3½; C. 14½.

#### Plate XLIV, figs. 20—26.

This species is nearly related to the *Dajaus diemensis*, of plate 26, figures 1—5, but it has still less of the massive proportions of the head which characterize a true Mugil, and has much of the general aspect of a clupeoid fish. It

differs from *diemensis* also in wanting the posterior scabrous plates on the palate, and in the different arrangement of those on the tongue, as may be perceived by consulting figure 4, plate 26, and figure 25, plate 14. Forster obtained his fish in Dusky Bay, New Zealand, and as Sir James Ross's specimens were obtained on the same islands, are tolerably well represented by George Forster's drawing, and possess the few special characters included in J. R. Forster's description, I have considered them to belong to his species. They have indeed lost their original tints and markings by long maceration in spirits, so that we cannot avail ourselves of his description of the colours of the recent fish for comparison, but he mentions the—thin lips, toothed jaws, minute teeth on the tongue, the roughness or villiform dentition of the palate, the straightness of the back, the profile of the head, "*caput vix declivē*," and the numbers of the fin-rays, all of which correspond tolerably nearly, though not exactly with our specimens. He enumerates, however, only five branchiostegous rays, when there are in fact six, but the lowest ray is small, and would escape detection except on dissection.

The species differs from *Mugil peronii*, *acutus* and *ferandi*, from the same quarters of the world, in wanting the acute keel on the tongue.

M. Valenciennes states the length of head of *forsteri* as being contained five times and a half in the length of the body, having taken these proportions from George Forster's drawing, but on referring to J. R. Forster's measurements, the number is found to be more nearly four times and nine-tenths, which corresponds sufficiently with the specimens, though not so well with our figure, in which the head is a trifle too long.

The teeth are arranged in narrow and finely villiform plates on both jaws, and on the mandible there is, in addition, a row of short, horizontal ones, penetrating the thin lip. The vomer and edges of the palate bones are rough with very fine and short teeth, as represented in figure 23, and the scabrous plates on the tongue will be best understood by referring to figure 25.

The outer gills are furnished with rakers, composed of a setaceous ray and a thin, tapering, membranous border, armed on its edge with a series of hair-like teeth, standing in pairs. The other arches are furnished with shorter compressed processes, joined at their bases by membrane, and having thin, obtuse summits, bristling on all sides with setaceous teeth. The upper pharyngeal bones are rather large, convex and rough with minute teeth. Each conceals a small cavity, which opens into the fauces and has a soft, tortuous roof.

The scales are truncated at the base, with about seven slightly divergent furrows, forming as many marginal crenatures. No teeth are visible on the disk or free edge, but there are some inequalities in the lines of structure. The branching fin-rays are finely dotted, as represented in figure 26. Figure 22 shows the pores on the head.

Forster describes the colours as azure-brown on the back, and silvery white elsewhere; the second dorsal and anal marked on the tips by a brown spot, the pectorals brown, and the caudal yellowish brown. He also informs us that this mullet is gregarious in the month of April,

enters fresh-water streams, and may be taken either with the hook or net.

Length  $8\frac{1}{2}$  inches, caudal included. Length of head  $1\frac{3}{4}$  inch (Forster). Our specimens measure generally about  $4\frac{1}{2}$  inches.

HAB. New Zealand.

#### MURENA.

Pisces anguilliformes, squamis omnino carentes, cute levi mucigena tecti.

Caput parvum, cute porosa ita obductum ut nec cranium, nec operculum, nec radii branchiostegi extus cernendi sint.

Gula magis minnsve extensiva plicata. Apertura branchialis minima, lateralis, in sacculum branchiis proprium a tergo intrans. Sacculus hic lateri utrique pertinens, branchiasque quatuor includens foraminibus quinque parvis rotundis intus aperit. Branchiæ rastellis vel processibus dentiferis carent.

Rostrum obtusum. Riētus oris ratione capitis longissimus, horizontalis, terminalis; maxillis ferē semper aequalibus, rarius subaqualibus.

Nares antice in rostro extremo utrinque positæ, tubulosæ; posticæ supra angulum oculi anteriorem patentes, sapius planæ, interdum tubulosæ. Oculi super medium oris rictum locati. Pori conspicui rictum supra subtusque ambientes, in rostro summo quoque dispositi.

Ossa cranii valida, solida, multum per anchylosin coacta. Ossa premaxillaria maxillæque desunt. Os nasi cum vomere ethmoideque in unum coalitum, dentiferum, minus ossium premaxillarum sustinens; os palati antice ad columnam orbitæ anteriorem ossi nasi per symphysis inherens, postice per tendinem pedicello inno mandibulæ connexum; cumque osse nasi rictum oris superiorem conficiens. Mandibula longa, occipit posticæ æquans vel transiens. Ejus pedicellum tympanicum os unicum, validum, triangulare in latere cranii late inherens.

Operculum cranio infra remotum pedicello mandibulæ adhærens. Rami branchiostegi octo vel decem filiformes, longissimi circa operculum curvati. Dentes in ambitu oris et in vomere seriebus variis instructi; aut acuti, vel subulati, vel pugioniformes (i. e. compresso-subulati, aciebus acutis), vel lanceolati; aut obtusiores vel conici vel graniformes. Ossa pharyngea duo superiora duo inferiora, linearia, dentibus recurvis armata.

Ventriculus longus super medium suum pyloro arcto pertusus. In *Murena silderea* valvulum spiralem in imo intestino elaboratum, inveni: alteras species non ritè examinavi. Vesicula aëris breviuscula, ovalis, pone partem superiorem ventriculū.

Duæ eorum series in utroque latere nsque ad extremam caudam attinentes; series superior paulo pone caput incipiens, series inferior ad anum; ambae validiores pone anum, dein versus apicem caudæ sensim decretescentes.

Having, through the kindness of Mr. Gray, an opportunity of carefully inspecting the *Murena* belonging to the British Museum, I subjoin the results of my examinations in preference to giving isolated descriptions of the species figured in this work, as being the most effectual way of

showing the relations of the latter to the other species to which I have had access. The nomenclature of the bones of the skull in this genus I found to be a subject of no little difficulty, and I have been glad to avail myself of that proposed by Professor Owen, in his recent lectures on the *Vertebrata*. Previous to their publication I had supposed that the border of the upper jaw of the *Muraena* was formed of the premaxillaries and maxillæ arranged nearly as in the salmon, but that the premaxillaries were intimately ankylosed with the nasal and ethmoid bones, forming the jaw and roof of the mouth back to the interior pillar of the orbit, where the disk is embraced by the fore part of the vomer. The maxillary also I considered as united to the palate bones, these forming the interior plates, which are more or less developed in different species, and only occasionally dentigerous, and then generally supporting tall, subulate teeth, like those on the mesial line of the premaxillary disk. Finding on the strong mandibular pedicle the small socket for the joint of the operculum, and the symplectic knob for the pivot of the lower jaw, I had supposed this bone to be composed of the union of the several parts constituting the *Systema pterygoideo temporale* of Cuvier.

The vertebræ next the head of the *Muraena* have a short, neural spine, a horizontal parapophysial process on each side, and a thin crest from the under surface of the centrum, opposed to the neural spine, and which I might have taken for a hæmal spine but for the authority of Mr. Owen, who denies that process to the fish. About the tenth vertebræ (in *M. helena*, and not far from it in other species) the mesial inferior crest divides and diverges on the three succeeding vertebræ until it joins the transverse, parapophysial process, to the extremity of which it adds height by giving it a second angular corner. As the vertebræ approach the anus the angular corners of the extremities of the parapophysial processes separate more and more from each other, the upper one remaining nearly horizontal and the other turning more and more directly downwards, until, with its fellow of the opposite side, it forms a deep canal. Finally, at the end of the abdominal cavity, and a considerable way past the anus, the canal is closed beneath by the union of its sides, and a spine is added to the arch of the hæmal passage, very similar to the neural one of the same vertebræ, so that the vertebræ of the posterior two-thirds of the tail possess a strong, compressed neural spine, a horizontal parapophysis and a hæmal canal and spine, seemingly formed of the inferior members of the parapophysis. Also there is a ridge at the base of the neural spines, and another at the base of the hæmal ones, for the attachment of the membranes in which the inferior and superior series of ribs lie. The upper row of ribs runs from the fifth or sixth vertebræ to the point of the tail, and the under one from the anus also to the tip of the tail. Each rib is forked at the end next the centrum, the shorter process having a small round head, and the body of the rib being thickest in the middle, or spindle-shaped. The stoutest ribs are situated a short way behind the anus.

The teeth are of two kinds, viz., slender or compressed, and very acute, breaking in the using and dropping out;

or conical and rounded on the summits, wearing flatter. Some of the acute teeth are simply subulate; others are compressed-subulate, with an acute, diaphanous edge before and behind, or they may be termed stiletto-shaped; such are the front teeth generally. In most species the outer teeth on both jaws, posterior to the front of the orbit, are considerably reflex, and have a narrowly-lanceolate shape, also with acute edges. In a very few species the teeth are serrated on the edge. The teeth stand on the edge and disk of the nasal bone, the palatines, mandibles and vomer, sometimes in a single series on all these bones, sometimes double on all, or in double and single series variously combined on the several bones.

In the following table the species are arranged in accordance with their dentition.

A. Teeth acute, subulate, stiletto-shaped. Gape large.  
a. *Uniserial palatine teeth*.

1. Uniserial teeth on all the dentiferous bones.

*M. helena*; *nubila*; *sagenodota*; *reticulata*; *ocellata*; *punctata*; *similis*.

2. Teeth biserial in the front of the mandible, uniserial on the sides of the mandible and on the other bones.

*M. prateruon*; *tenebrosa*.

3. Biserial teeth in the front of the mandible and hind part of the vomer; uniserial teeth on the other bones.

*M. lita*.

4. Biserial teeth on the nasal bone, on the front of the lower jaw and on the vomer.

*M. sidera*.

b. *Biserial palatine teeth*.

1. Uniserial nasal, mandibular and vomerine teeth.

*M. isingleena*; *bullata*; *stellifer*; *cancellata*; *tesellata*; *colubrina*; *moringua*.

*Obs.*—When the inner palatine teeth are only one or two in number they are easily broken away, and the dentition then is similar to that of group A. 1.

2. Front mandibular teeth biserial; vomerine and nasal teeth uniserial.

*M. griseo-badia*; *parouina*.

3. Nasal teeth pluriserial; vomerine and mandibular teeth uniserial.

*M. guttata*.

4. Teeth biserial on the front of the mandible and on the vomer; uniserial on the nasal bone and sides of the mandible.

*M. thyrsoidea*; *sathete*.

5. Biserial on all the bones except the sides of the mandible.

*M. gracilis*; *vermiculata*; *meleagris*; *viridis*.

B. Gape moderate. Teeth conical, subacute or rounded.—MOLARI.

a. Palatine teeth uniserial, subacute.

*M. ophis*; *variegata*.

b. Palatine teeth biserial, obtuse.

*M. polyzona*; *catenata*.

The following species have not come under my inspection, and I have not therefore been able to place them in the above table.

*Murena unicolor*, Laroche, Ann. Mus. xiii. 15. Low, Tr. Geol. Soc. 2, p. 192. *M. picta*, Thunberg, Spec. Ichth. 7, t. 1, f. 2, or *Muranophis pantherina*, Lacep. v. 641. *Muranophis grisea*, Lacep. v. 644, pl. 19, f. 1. *Murena sordida*, Cuv. Règne An. 2, p. 352. Seba 11, 69, 4. *Murena reevesii*, Richardson, Ichth. of Voy. of Sulphur, p. 109, pl. 49, f. 2. *Gymnothorax rostratus*, Agassiz, Pisc. Bras. 50, a. *Murena geometrica*, Rüppel, Atl. 118, t. 30, f. 1. *M. tigrina*, Idem, t. 30, f. 2. *M. flavimarginata*, Idem, t. 30, f. 3. *M. hepatica*, Idem, p. 120. *M. cinerascens*, Idem, p. 120. *M. bilineata*, Idem, p. 120. *Muranophis lineata*, Lesson, Voy. de la Coquille, t. 11, f. 1. *M. fluceola*, Idem, f. 1. *M. anatina*, Low, Tr. Zool. Soc. 2, p. 192. *Gymnothorax faragineus*, Bl. Schn. t. 105, p. 323. *G. afer*, Bl. 417, Schn. p. 326. *G. witsoni*, Schn. p. 329. *G. scriptus*, Schn. p. 329. *G. brazilensis*, Schn. p. 329. *Strophidon literatum*, J. McClelland, Calc. Journ. of Nat. Hist. 1844, t. vii. fig. 2. *Strophidon punctatum*, Idem, t. vii. f. 3 (nec *M. punctata*, Bl.). *Therodontis reticulata*, Idem, vii. f. 1 (non *Gymnothorax reticulatus*, Bl. 416, an *M. tessellata*, Richardson?). *Gymnomurena marmorata*, Lacep. v. pp. 648, 650. *Nettastoma melanura*, Raff. Caratt. pl. 16, f. 1, or *Murena saga*, Risso, prem. ed. f. 39, and many others scattered in different works.

#### MURENA HELENA. Linn.

*Murena helena*, Bl. t. 153. *La flutte*, Encycl. Meth. t. 23, f. 79.

RADI:—B. 8; D. 332; A. 220 = 552 (Gibraltar spec.).

Plate XLIX., figs. 1—6 (Australian spec.).

Considerable variety exists in the shades of colour and in the size and distinctness of the spots in different examples of this fish from the same locality, much exceeding any peculiarity that I could detect on a careful comparison of the Australian specimen figured in plate 49, with several others from Malta and Gibraltar.

The teeth are subulate, more or less compressed, and very acute, with thin, cutting edges towards the tip, the nasal teeth, however, and the anterior mandibular ones being considerably rounded in front towards the base. All are inclined backwards. The posterior nasal and adjoining palatine tooth are the tallest of the series, and these, with some of the neighbouring ones, and also a few on the lower jaw, have an acute notch on the posterior edge, with a slight basal lobe beneath it. Nasal teeth about twelve, exclusive of about ten very short ones, alternating with them, but rather exterior to their bases, so that the marginal nasal teeth may be considered as making an approach to a biserial arrangement. Three teeth on the mesial line of the nasal disk long, slender and very acute, the posterior pair being the tallest in the mouth. Eight or nine small, acute, uniserial vomerine teeth. Palatine teeth about ten, uniserial. There are about sixteen or

seventeen conspicuous teeth on each limb of the mandible, exclusive of small ones at the bases of the front teeth as on the nasal bone.

Posterior nostrils shortly tubular. Eye moderately large, rather posterior to the middle of the rictus. The upper and lower jaw are bordered by a row of large pores, and there are also six on the top of the snout, arranged as shown in figure 2. Vent one twenty-fourth part of the whole length before the middle of the fish. Dorsal fin commencing before the gill-opening, gradually increasing in height until it attains its greatest elevation beyond the vent. Both it and the anal are conspicuous towards the tip of the tail, which is considerably compressed.

The ground colour of the fish is dark, or blackish brown, and is varied by white, oval, roundish, or irregular marks of various sizes; larger on the fore part of the fish, and so crowded on the head as to produce merely a brown and white mottling; becoming gradually smaller and more distinct posteriorly, and towards the tip of the tail arranged so as to produce a distant banded appearance. The white marks include oval and roundish blackish spots, generally darker than the ground colour. The throat and belly are pale, with a more minute mottling, and the folds of the throat, the corners of the mouth and the gill-openings are black. Snout and lower jaw less spotted.

The edges of the dorsal and anal are marked by a series of small white dots, most crowded on the anal, and the bases of these fins are spotted on each side by a less dense series (vide fig. 5, giving a front view of part of the anal).

The colours and spots of the Australian specimen described above, are extremely similar to those of one obtained at Gibraltar. Having had the skeleton of this latter one made, I ascertained, by repeated and careful enumeration, that the rays of the dorsal were 332, and of the anal 220, or 552 in all. The rays appear simple, and are without perceptible joints, but most of them can be split at the tips into two branchlets. There are 142 vertebrae, 71 of which are abdominal, but the anal fin extends forwards to the sixty-third. The air-bladder is oval, and about  $1\frac{1}{2}$  inch in length.

A second Gibraltar specimen differs slightly in the pale parts, having a dilute orange tint, and in the mottling of the belly being more resolvable into spots, like those on the sides.

The British Museum possesses a variety from the Bay of Naples, in which the pale colour is reduced to roundish and angular white specks, about the size of a pin's head, placed at the corners of the black spots, and at first sight the fish appears to be dark liver-brown, speckled with white, but on a closer examination the figures of the dark spots may be traced. Towards the end of the tail the whitish dots are arranged in vertical bars, five or six in each bar. The white specks on the edges of the fins are more remote than in the more common variety.

An example from Malta, in the Haslar Museum, has fewer and smaller white dots.

	inches.	inches.
Length of two Australian examples 25	Gibraltar do. 30.0	
Distance between snout and anus	12	14.1
„ „ gill-opening	2.86	3.6



HAB. Mediterranean. English Channel. North African coast. Indian Ocean (Bloch). Australian seas.

MURENA NUBILA. Richardson.

Plate XLVI., fig. 6—10.

Teeth uniserial, compressed-subulate, tapering and very acute, (or stiletto-shaped). Nasal teeth twelve, widely set and moderately tall, with a minute subulate one between each pair. Two teeth placed well forward on the mesial line of the disk, the second one being the tallest in the mouth. Twelve conico-subulate, sharp-pointed, very short vomerine teeth, the anterior one standing a little out of line. Palatine teeth twelve, slightly reflex, the two anterior ones smaller than the rest, which diminish slightly in size from the third to the corner of the mouth. Mandible armed by fifteen or sixteen teeth on each limb, the anterior ones taller, more remote, and having one or two minute, subulate ones in their intervals.

The head of this species is considerably compressed, the jaws equal, and the snout obtuse, with a sloping profile, concave at the eye. The fold of skin which envelops the dorsal is less thick than in many species, and rises suddenly, with little slope, about half-way between the eye and gill-opening. The fin continues high and very conspicuous throughout the back to near the end of the tail, where it narrows a little. The posterior nostrils are not tubular, the eye is rather large, the gape also large, and the distance from the tip of the snout to the gill-opening is about one-eighth of the whole length of the fish, while the anus is a fourteenth of that length before the middle of the fish. The usual pores exist on the snout and upper and lower lips, and the lateral line consisting of a series of small pores is sufficiently evident. Three black tapering streaks are conspicuous on the throat, the uppermost running back from the corner of the mouth. The body is marked by cloud-like spots, forming a series of irregular, and in some places, confluent bars. The spots commence on the lower part of the dorsal, and descend over two-thirds of the height. The ground colour is brownish on the back and pale or whitish on the belly. The dorsal and anal are bordered by a well-defined, deep black stripe, which is very narrowly edged exteriorly with white.

Cæcal stomach not reaching down to the anus. Pyloric orifice nearer to the gullet than to the point of the sac. Liver placed beneath and rather to the right of the stomach. An oblong oval air-bladder lies behind the œsophagus. The spiral valve of the lower intestine was not made out, owing to the state of the parts.

Length of the specimen 21.5 inches. Distance between tip of the snout and the anus 10 inches. Distance from ditto to the gill-opening 2.6.

This fish was obtained at Norfolk Island, by Dr. M<sup>r</sup> William, of the Royal Navy, Surgeon to the Board of Customs. A dried skin of a murrey, belonging to the British Museum, which was procured by Mr. Gilbert at Houtman's Abrolhos is probably the same species, which in that case inhabits both coasts of Australia. The small intermediate teeth among the intermaxillaries do not exist

in this latter example, and the larger ones have rounded, compressed, posterior basal lobes not observable in the Norfolk Island specimen, being, perhaps, concealed by the soft parts, but there is no other remarkable difference in dentition. The anal has a whitish edge surmounting a black stripe, and there are spots on the sides, but much defaced by the drying of the specimen. It measures twenty-two inches in length.

A third specimen, like the last, a dried one, and also existing in the British Museum, was prepared by Dr. Janvier at the Mauritius. It has the same dentition with the Norfolk Island fish, except that a third tall tooth is present on the mesial line of the nasal disk, and from the specimen being dried the alternate arrangement of the vomerine teeth is perceptible, though they appear on a cursory examination to be in one series. Some of the spots or bars descend over the belly, and there are traces of six or seven black streaks on each side of the throat. Length 44.3 inches. To anus 23. To gill-opening 6.4.

HAB. Seas of Australia and of the Mauritius.

MURENA SAGENODETA. Richardson.

The only example of this species which we have seen is a dried one in the British Museum, which was prepared by Dr. Janvier at the Mauritius.

There is considerable resemblance between it and *M. nubila*, but it appears to have a thicker body, particularly about the throat, while the vent is a little farther forward. The uniserial teeth are comparatively stouter, with less acute edges, and stand in a closer series both anteriorly and posteriorly. The highest on the edge of the upper jaw are the posterior nasal ones and adjoining palatines, whence they decrease gradually in both directions. Many of them have a minute notch near the middle of the anterior edge, and most have a conspicuous posterior basal lobe. There are about nineteen between the symphysis and corner of the mouth on the upper jaw and a corresponding number below, there being no small intermediate ones on the fore part of either jaw. The mesial teeth on the nasal disk are entirely absent in the specimen, and the disk itself is rather long and concave, without any pits. The vomerine teeth are minute, and do not exceed three in number.

Posterior nostrils not tubular. Eye moderate-sized, and rather before the middle of the gape of the mouth. Dorsal commencing about half-way between the corner of the mouth and the gill-opening. Anus as nearly as possible in the middle of the fish. Distance between the tip of the snout and the gill-opening nearly one-seventh of the total length.

Ground colour of the dried skin brownish, varied by thirty-two or thirty-four irregular, blackish vertical bars, which descend from the dorsal fin and branch and anastomose about the gill-opening, so as to produce five or six meshes in the height, the bar-like arrangement not being perceptible there; more posteriorly the meshes are larger, and not above three or four in the height; at the anus they increase in size and diminish to two in the height, while towards the end of the tail the meshes are wholly superseded

by bars. The areas throughout are traversed by fine, dark lines, like veins in marble, and on the head and throat the mesh-like arrangement gives place to a fine mottling of the dark brown, with a paler colour in smaller quantity. No traces of this mottling are perceptible in any of the examples of *M. nubila*. In the specimen the dorsal fin ends abruptly about an inch from the point of the tail, the anal being perfect. The defect appears to have arisen from mutilation before death.

Length of the fish (dried) ....	41.50 inch.
From tip of snout to anus ....	10.75
From ditto to gill-opening ....	6.01

HAB. Coasts of the Mauritius.

#### MURENA RETICULATA. Bl., 416.

*Gymnothorax reticulatus*, Bl. Schn. p. 528. Bl. 416.

Teeth compressed-subulate, disposed in a single series on both jaws. The nasal teeth, about fourteen in number, are a little more remote, and the palatine ones are more compressed, closer, more reflex, and diminish in size as they approach the corner of the mouth, but there is no sudden change in the series, either of form or height. The palatine teeth number about ten, and the series on the mandible corresponds generally with that of the upper jaw. The usual three mesial teeth exist on the nasal disk, and there are about seven small, acute vomerine teeth in one row. When the teeth are examined with a lens the maxillary ones and those on the anterior part of the lower jaw are seen to be minutely crenulated towards the base posteriorly, and beneath the crenatures is a compressed, rounded lobe, which is inserted into the gum.

Eye moderate-sized. Posterior nostrils not tubular. Snout obtuse. Profile full, slightly arched. Gape moderate. Dorsal commencing before the gill-opening. Throat plaited, distensible. Anus one-twelfth part of the whole length before the middle of the fish.

Ground colour pale honey-yellow, with about twenty dark, hair-brown bands, encircling the body and dorsal fin. The intervals are about equal to the bands in breadth, and are marked with round, brown dots, intermixed with many minute brown specks. The upper parts of the bands are formed of a close assemblage of dots and spots, but the belly parts are homogeneous. The head and lower jaw are spotted with brown, the ground colour of the lower jaw and throat approaches to white, and three of the bands which belong to the nape and throat are less complete, being decomposed more or less into irregular spots. The intervals between the bands on the belly are nearly aurora red, while the intervals on the dorsal and anal are white on the edge. The anal is banded like the dorsal, but not spotted as that fin is.

Length 12.5 inches. Distance between the tip of the snout and the anus 5.5 inches. Distance between ditto and the gill-opening 1.5.

HAB. Indian Ocean (Bloch). Sea of Borneo (Sir E. Belcher).

#### MURENA OCELLATA. Agassiz (Gymnothorax).

*Murena tricolor*, Banks et Soland. MSS. Parkins. Icon. in Bibl. Banks, 2. Breussinet MSS. *Gymnothorax ocellatus*, Ag. Pisc. Bras. Spixii, p. 91, t. L. b. figs. 6—9.

#### Plate XLVII., figs. 6—10.

The individual figured in the plates was obtained somewhere in the Atlantic, but the exact locality was not noted. A Brazilian specimen exists in the British Museum, and there is another in the Museum at Haslar.

The teeth, which stand in a single series on all the bones, are much compressed, with sharp edges, tapering, and very acute, most of them finely serrated behind and before, the serratures being most readily seen near the base behind. The highest teeth stand on the palatines and fore part of the mandible, and they are there more widely set. On the palatines their outline is narrowly lanceolate, as are also the lateral ones on the mandible. The three mesial teeth exist, as usual, on the nasal disk, and they are serrated like the others, but they are scarcely so high as the front marginal teeth, and having been partly broken away in the specimen which we have figured, they have been omitted by the artist in plan, figure 3. The vomerine teeth, small and acute, are hidden by the soft parts.

This murrey has a blunt snout, a large eye, and a more than usually tapering tail, with a narrow tip. The dorsal commences a little before the gill-opening, and rises very gradually, but is not high anywhere. The position of the anus varies in different individuals. The specimen which is figured has the vent one-fourteenth part of the whole length before the middle, two others have it respectively at the twelfth and the nineteenth part. The posterior nasal openings are not tubular. The lateral line formed by a series of pores in the middle of the height is conspicuous. The ground colour after long maceration in spirits is hair-brown, which, on close examination, is found to be produced by a minute reticulation of darker and paler lines. It is thickly studded by roundish and oval spots of various sizes, on the back and sides, none of the spots exceeding a pea in magnitude. About thirty black spots on the dorsal and fifteen on the anal, alternate with white marks. Towards the end of the tail the spots are larger, and form bars.

	Atl. spec.	2nd do.	Braz. spec.
Total length ....	17.5	12.5	19.5
From snout to anus ....	7.5	5.5	9.25
„ gill-opening .....	2.35	1.42	2.58

HAB. Western side of North Atlantic Ocean. Coast of Brazil.

A murrey taken in the Gulf of Mexico by Assistant-Surgeon Rayner, of the Royal Navy, and presented to the Museum at Haslar, appears to be a slight variety of the above. It has the same form and dentition, but the spots on the body are much more numerous, and the fins, instead of being distinctly banded, have a continuous black

edge, with a white stripe beneath it. The white stripe approaches the edge of the fin at intervals, so as to give it somewhat of a banded appearance when folded. Length 15 inches. Length from snout to vent 7 inches. Length from ditto to gill-opening 1.9 inch.

HAB. Gulf of Mexico.

*MURENA PUNCTATA.* Bl. Schn.

*Gymnothorax punctatus*, Bl. Schn. p. 526. *Calamaia paum*, Russell, xxxii.

A dried, overstuffed, and not quite perfect example of a *Murana* exists in the British Museum, which possesses the characters ascribed by Schneider to *punctata*.<sup>\*</sup> It was purchased from a dealer, and its place of capture cannot be ascertained. Russell's figure is a pretty good representation of the fish.

Teeth in a single series on the several bones. On the border of the nasal bone there are fourteen, which are compressed, with acute edges and points. Three tall, subulate, slender ones on the mesial line of the disk, and five short, slender, and very acute ones on the line of the vomer, the series commencing at some distance from the nasal disk. Ten or eleven on each palatine bone shorter, and scarcely wider than the nasal ones, reflex, more closely set, and diminishing in size towards the corner of the mouth. Eleven or twelve lateral teeth on the mandible closely set, equal in size, compressed, acute and reflex, with two much stouter and a little taller widely set in the same series on each side of the symphysis.

Eyes rather large, over the middle of the gape of the mouth, which is of moderate size. Nose straight, with the hinder part of the head apparently rising suddenly. Posterior nostrils not tubular. Dorsal commencing a little before the gill-opening. Anus in the dried specimen very little before the middle of the fish.

In the spotting this *Murana* most resembles *paronina*, but the spots are smaller, more numerous and less regular, several of them in various parts being oblong. They have their borders similarly darkened, are about the size of partridge shot, and are pretty regularly scattered over the head, body, belly and fins; towards the top of the tail they are smaller and less crowded. The rays of the dorsal are short at the commencement, and increase gradually to opposite the vent, where they are in the specimen here described about an inch long, and they lose little of their length till within three inches of the tip of the tail.

Length 34.25 inches. Distance from tip of snout to anus 16.75 inches. Distance from ditto to gill-opening 4.2 inches.

HAB. Indian Ocean.

<sup>\*</sup> Schneider's account of the species is "*Gymn. punctatus*, (*Dentium palatinarum longa serie*) corpore compresso, colore brunneo, maculis parvis aurantiacis, ovalibus, limbo brunneo, pinna dorsi ante spiracula exserta, recta angustiore antecendentibus, naribus tubulosis, maxilla superiore longiore. Longus 2½ ped. Variat punctis flavis; b. punctis et maculis brunneis.

*MURENA SIMILIS.*

*Spec. altera*, &c. Forster, J. R. Descr. An. p. 183.  
"Muranophis. Faun. Jap."

Nasal teeth eight or ten, moderately tall and very acute, with three taller and more slender teeth on the mesial line of the disk; succeeded by eight or nine short, acute vomerine teeth, standing in a single series. The palatine teeth, also uniserial, are reflex, and more closely set than the nasal ones, but not broad enough to be termed lanceolate: all are acutely two-edged towards the tips. The mandible is armed by ten lateral teeth, similar to the nasal ones, but taller, also by two stoutly subulate ones on each side near the symphysis, standing in the same row.

The gape of the mouth is rather large, the eye moderately so, the posterior nostril is not tubular, and the dorsal commences before the gill-opening (about half an inch in the specimen described). The anus is situated about one-sixteenth of the whole length before the middle of the fish.

Colour pale wood-brown, finely mottled with irregular, star-like specks, of dark hair-brown. The specks are scattered generally over the ground tint, and are also densely aggregated in patches, producing about twenty or more large spots, which run along the sides, and extend to the dorsal fin. A narrow line along the middle of the throat connects a series of the small specks, and the folds of the gill-membrane are traced on each side by similar lines. The anal fin is marked out by a black line surmounted with a white edging. The dorsal is not so edged. Lining of the mouth blackish and mottled. Length 24 inches. To anus 10.5 inches. To gill-opening 2.7.

HAB. Polynesia. Red Sea. Sea of Japan.

This *Murana* has a pretty close resemblance to *M. variegata*, but the spots do not branch off in a radiated way, and the dentition is widely dissimilar. It agrees in its large gape, sharp teeth, five parallel dark lines on the gill-membranes, and in colours with the specimen obtained at Otaheite by Forster, and noticed after his account of *Echidna variegata*. It is probable that the native name of "Boohée" is restricted to this species, as the name of "Pipiro" only, is written on George Forster's drawing of *M. variegata*. Rüppell's plate of *M. ophis* has a still closer resemblance in colour and markings to *similis* than *variegata* has, but the shortness of the gape distinguishes *ophis* from the present species. The specimen in the British Museum, from which the above description was taken, is from Japan, and is marked "*Muranophis*, Faun. Jap." Not knowing what appellation the authors of the *Fauna Japonica* mean to give it, I have termed it *similis*, to denote its general close resemblance to *variegata* and *ophis*. I would gladly have adopted Forster's name *echidna* as a specific appellation for this species, but it has been applied by Schneider to *variegata*, and would lead to confusion if used to designate another species. Lacepede's *Muranophis echidna*, which, he says, has a very large gape, bristling with many teeth, cannot be *variegata*. He refers to Ellis, in Cook's third

voyage, as his authority, but on turning to that work I find only the following sentence: "Amongst these were some large eels, beautifully spotted, which, when followed, would raise themselves out of the water, and endeavour with an open mouth, to bite their pursuers." (Voy. to Pacif. by Capt. Cook, Clerke and Gore, 1776-80, vol. i. p. 219. Lond. 1784).

#### MURÆNA PRATBERNON, Quoy et Gaimard.

*Muræna pratbernon*, Quoy et Gaimard, Voy. de Freycinet, Pl. 52, fig. 1.

Fourteen marginal nasal teeth of a stoutly subulate form, with much smaller ones not forming a regular exterior series, but mostly standing in the intervals of the taller ones. Two strong, stoutly subulate mesial teeth in the fore part of the disk; followed at an interval by three small, compressed, and not very pungent vomerine teeth in one row. Palatine teeth uniserial, nineteen or twenty on each side, lanceolate, reflex, and moderately acute. Mandibular teeth at the end of the jaw, about six on each side, similar to the principal nasal ones, with much smaller teeth of several sizes exterior to their bases, in two or three rows, being nine or ten in number on each limb. The lateral mandibular teeth are like the palatine ones.

Snout obtuse. Eye rather small, and situated somewhat before the middle of the gape. Posterior nostrils not tubular. The origin of the dorsal, some of whose rays are an inch-and-a-half long, cannot be ascertained, owing to the state of the specimen. Ground colour of the skin purplish brown, with numerous round, black dots, the size of a small pea on the upper part of the head. Round the gill-opening the spots assume various forms from the confluence of two, three, or more. Farther back the dark marks have the shape of imperfect rings or stars, and towards the tail the size of the compound spots increases. In the middle of the tail they have considerable resemblance to the spots of *M. helena*, the purplish ground colour forming a mesh work round the spots, and perforating their disks. The under jaw and fore part of the belly have the ground colour varied by only a few faint, small spots. There is, however, no white on the fish, nor any pale spots on the edges of the fins, such as exist in *M. helena*, to which the species nearly approaches in many respects. A large black ring surrounds the gill-opening, and the corners of the mouth are also black, the palate and gullet being dark brown. The specimen in the British Museum measures 74 inches, but it has been skinned in such a way that the exact position of the vent cannot be ascertained. The following measurements of a recent example were taken by J. B. Jukes, Esq. "Length 57 inches. From the snout to the anus 30 inches. From anus to tip of tail 28 inches. Girth at the gill-opening 13 inches. Girth of the body where thickest 17 inches. Girth at the vent 13½ inches.

HAB. Darnley Island (Jukes). (Quoy et Gaimard).

#### MURÆNA TENEBROSA, Solander.

*Muræna tenebrosa*, Banks et Solander, MSS.

The British Museum possesses a specimen of this fish preserved in spirits, which was obtained from the College of Surgeons, and was most probably the individual taken on Cook's first voyage, at the Society Islands. The native name is written "*Epu*," or "*Ebui*."

Nasal teeth pretty tall, rather widely set, subulate, and very acute, in one series forming a semicircle round the end of the jaw, the front teeth being the lowest. Three tall, subulate and slightly recurved mesial teeth on the disk. Followed after an interval by nine short, acute vomerine teeth, disposed in one slightly irregular row. Palatine teeth 17, uniserial, tapering, and very acute; the four anterior ones shortest, the middle of the series tallest, and all slightly reflex. Each limb of the mandible is armed by sixteen or eighteen teeth, resembling the palatine ones, with three tall subulate interior ones at the fore end, making there two rows.

This is a slender, considerably compressed *Muræna*, has plain posterior nostrils, the dorsal commencing well forward on the nape before the gill-openings, and the anus situated about one twenty-sixth part the whole length before the middle of the fish. The tail is acute. The colours have totally faded. Solander's short description which mentions them is as follows:—

"*Iris castanea. Pupilla nigra, annulo luteo. Pori capituli concolores cum corpore. Totu e sordide purpureo fusco, fasciis maculisque transversalibus, latis, numerosis, nigricantibus; tam obscurus est piscis ut primo intuitu vix inter colorem corporis et fascias differentia videtur. Dentes in maxillis et fauce uti in antecedente (M. atomaria). Nullam autem labia faucis videre licuit.*"—Solander, l. c.

Length 13½ inches. To anus 6·22. To gill-opening 1·62.

HAB. Polynesia.

#### MURÆNA LITA, Richardson.

Nasal marginal teeth fourteen, increasing gradually in height as they recede from the symphysis. A single mesial tooth only is left on the disk, which has perhaps received injury, and a second marginal row may have originally existed to correspond with the double row at the end of the mandible. Vomerine teeth short and rather obtuse, disposed in a single row anteriorly, but the two last pairs are in two uneven rows. Palatine teeth eleven, uniserial, compressed, subulate, very acute, and moderately reflex, diminishing gradually from the second, which is the tallest, to the corner of the mouth. Mandibular teeth partially biserial. There are fourteen on each limb, compressed, subulate and acute, tallest and more widely set near the symphysis, and decreasing gradually as they approach the corner of the mouth. At the fore end of the jaw there is an exterior row of six short, rather closely set, more obtuse cutting teeth.



Posterior nostrils very close to the eye, not tubular. Dorsal commencing a very little before the gill-opening. Anus rather behind the middle of the fish.

Colour generally a dark, dingy brown, but when closely examined the prevailing hue is found to be produced by roundish, liver-brown specks, of the size of a pin's head, crowded so densely towards the back as almost to exclude the pale ground tint, but which separate on the sides, so that the ground colour forms reticular lines. On the belly the spots are comparatively widely set, and much of the ground tint appears. An obscure reticulation on a larger scale can also be made out, dividing the side of the fish into about four rows of spots as big as a pistol bullet, set alternately. On the head and throat are many small, brown spots, occupying less space than the pale orange-tinted ground colour. Fins a little whitish on the edges.

Length 18·5 inches. To anus 9·6. To gill-opening 2·6 inches. From anus to tip of tail 8·9 inches.

HAB. The Moluccas. (Spec. in the British Museum, received from Berlin, labelled *M. variegata*).

#### MURENA SIDEREA. Richardson.

RADI:—Br. 8; D. 306; A. 192 = 498.

Plate XLVIII, fig. 1—5.

Principal series of nasal teeth about twelve in number, compressed-subulate, with acute edges, or narrowly lanceolate, and moderately tall, with an equal number of short, conico-subulate, bluntish, angular, or furrowed teeth, ranged close to their bases exteriorly, most crowded at the symphysis, where they form two rows, or three in all. On the mesial line one stout, conico-subulate tooth is placed well forward, the two more posterior ones usually seen in the *Murena*, being either wanting in this species, or more likely broken off in the three specimens that we have examined. The vomerine teeth are in two rows, the rows commencing on the anterior corner of the bone on each side of the nasal disk, and gradually approaching each other, so as to coalesce in the back part of the mouth. This disposition of the teeth is not very happily represented in plate 48. These teeth are very small and short, with acutely compressed, but not pointed tips.

Palatine teeth eight, uniserial, close set, reflex, narrowly lanceolate, and diminishing in size as they approach the corner of the mouth. Each limb of the mandible is armed from the symphysis to the corner of the mouth with a series of fourteen or fifteen narrowly lanceolate, very acute, and moderately reflex teeth; and at the end of the jaw there is an exterior row of seven close set, short, conical, furrowed teeth, almost concealed by integument; there is also a small tooth close to the symphysis still more exterior than this row, making the teeth three deep at that spot.

The snout is obtuse, the eye moderately large, the posterior nostrils are not tubular, and the gill-opening is larger than usual, and placed at a considerable distance

from the corner of the mouth. The fold of skin investing the dorsal is very lax, and comes forward to the eyes, from behind which it rises in a high and abrupt curve. The dorsal commences a little way before the gill-opening, or about half an inch in a specimen measuring twenty-seven inches; and its first rays are short, the succeeding ones increasing rapidly until they attain the full height of the fin, which is even for the greatest part of its length. The anus in one specimen is about a fiftieth part of the whole length beyond the middle, while in another it is a thirtieth part, the tail being comparatively short in the latter. This is an instance of the danger of relying solely on such measurements for the establishment of specific characters in this genus.

The heart is situated between the gill-openings and four gills are placed in a bag on each side of the throat. Each gill-opening enters its proper bag at the posterior part, and there are five round holes by which the bag communicates with the gullet, four of the holes perforating the bases of the four gills, and the fifth the membrane behind the last gill. No part of the gills adheres to the walls of the sac, and there are no rakers on the anterior borders of the gill-plates.

On opening the belly the liver is seen lying to the right of the stomach, but not exceeding one-third of the length of that viscus, which is a long, conical bag, reaching downwards to the anus. The pyloric orifice is a small, round, lateral opening, situated midway between the gullet and the tip of the stomach, which in a specimen measuring twenty-seven inches is ten inches and a quarter long. The internal coat of the stomach is plaited longitudinally. The gut descends from the pylorus behind the liver, parallel to and in contact with the stomach, and near the anus there is a dilated part, which contains a complete spiral valve, formed by transverse septa, each having a semilunar notch, which is alternately turned to the right and left. Two or three valves are strengthened by longitudinal folds of membrane from the side of the gut. There are in all six transverse valves, and a smooth piece of gut intervenes between the valvular part and the anus.

The ground colour is white on the throat and belly, with a purplish gray or slightly brownish tint towards the back, interspersed with innumerable roundish, dark, blackish purple specks, about the size of a pin's head. The spots are more rare on the middle line of the belly towards the vent, numerous on the cheeks and sides, and densely crowded and more or less confluent on the back and fins. They are aggregated and blacker in oval and roundish patches disposed in three or four rows along the fish. The specks are not represented round enough in the figure. The fins are slightly edged with white towards the tip of the tail.

Length	....	....	28·25	26·75 inches.
"	from snout to anus	....	14·60	15·00
"	" to gill-opening	....	3·90	4·25
Height of body	....	....	1·90	2·00
Thickness of ditto	....	....	1·00	1·10

HAB. The western and northern shores of Australia and the coasts of New Guinea.

Solander describes a *Murena* which he observed among the Society Islands, where it is named "Eaulha" or "Eawrha," which may prove to be this fish. I am, however, prevented from adopting his specific name by the spots in our fish having no transverse elongation nor any bar-like arrangement. His description is:—

"*MURENA ATOMARIA*. P. pect. nullæ. Tota glauca irrorata atomis fuscis fascisque numerosissimis interruptis seu maculis transversalibus dorsalibus, lateralibus et abdominalibus seriatis dispositis. Maculæ pinnis extenduntur. Nares tubulosæ. Puncta in capite aliquot alba, porosa: 2 inter oculos, 2 supra naves, pauca utrinque prope latera maxillæ superioris; circiter 5 utrinque secunda maxillam inferiorem. Dentes lanceolati (in maxillis) parum reflexi, compressi acutissimi, fixi; tres vel quatuor in exteriori parte palati, reflexibiles; multi in fauce, sed ad interiores fauces quasi labra dua antrorsum attenuata, supra et inferne ambo dentibus obsita. Iris ex argenteo plumbea. Pupilla nigra annulo aureo."—Solander, MSS., p. 28.

The same naturalist mentions another *Murena*, taken in the same neighbourhood, named "Epui," which he thinks may be a variety of *atomaria*.

"*MURENA ERYTHROPTERA*, oculi parvi plumbeo-fusci. Pupilla nigra. Annulus latus intense miniatus. Iris griseo-cerulescens. Macula nigra circa orbitas, postice laterali. Totus piscis fuscus immaculatus. Pori laterales capituli prope maxillam plures; tres utrinque albi et puncti 2 porosi albi inter oculos. Pinne sordide rubescentes. Forte var. *M. atomaria* p. 28, nullæ autem atomæ."—Solander, MSS., p. 102.

#### *MURENA ISINGLEENA*. Richardson.

*Murena isingleena*, Richardson, Ichth. of Voy. of Sulphur, p. 108, pl. xlviii. fig. 1. Idem, Report on the Fishes of China to the Br. Assoc. Icon.—Reeves, 237, Hardw. ined. 305, in Mus. Brit.

About ten uniserial, marginal nasal teeth, subulate and acute, with no small ones intervening. Three tall ones on the mesial line of the disk, and one row of very short, acute vomerine teeth. Eleven or twelve reflex palatine teeth, the three heading the series smaller, and within them two taller, slender teeth, forming the second row. The mandible has ten or eleven lateral teeth, with four larger ones more widely set at the fore end of the limb.

The specimen after maceration in spirits has a dilute brown ground colour, paler on the belly, and is marked with blackish spots, varying in size from that of a pea to a small bean, mostly round, but in many places, from aggregation of several spots, of an irregular form. The head is covered with spots of the size of a pea, in which it differs from *bullata*, which has only a few small dots on the head. The furrows on the throat are not black, and the spots are scattered over the belly, in which respect also it differs from *bullata*. No white edges to the fins.

Eye rather small. Posterior nostril not tubular. Gape of the mouth moderate. Dorsal commencing before the gill-opening, and the fold of the skin which encloses it

extending along the nape. Anus very little before the middle of the fish.

Length of the specimen in spirits 16·4 inches. To anus 8 inches. To gill-opening 2 inches. Length of a dried skin 47 inches.

HAB. Sea of China, near Canton.

#### *MURENA BULLATA*. Richardson.

Marginal nasal teeth about eight tall, subulate ones, with several small ones between each pair; three teeth as usual on the mesial line, and a series of acute vomerine teeth, mostly concealed by the swelling of the soft parts. Palatine teeth sixteen compressed-subulate, very acute, reflex, the four anterior ones smaller, and within them, in a second series, three tall, setaceous teeth. Sixteen lateral teeth on each limb of the mandible, resembling the palatine ones, and three tall, subulate ones next the symphysis, in the same row.

Eye moderately large. Posterior nostrils not tubular. Dorsal commencing before the gill-opening. Anus about one-fourteenth of the whole length before the middle of the fish.

General colour of the fish after maceration in spirits, lavender purple, varied by about four rows of round, black spots, as big as swan shot, one of the rows being on the dorsal: the lowest row is of smaller spots than the others, and none of them are perfectly regular in their distribution. Some of the spots are conjugate, and at the tip of the tail they form bars. The inside of the mouth is purple. The furrows of the throat and cheeks are black. Edges of the dorsal and anal pale. Belly not spotted.

This fish is spotted much like *M. isingleena*, and it may be merely the young of that species, or a local variety, the dentition being similar, but as there is a difference in the general tint, and the spots are fewer, more simple and regular, the gape of the mouth larger, and the anus a little farther forward, I have given it a specific name. Length 12·4 inches. To anus 5·35. To gill-opening 1·46 inches.

HAB. Sea of Borneo (Sir Edward Belcher).

#### *MURENA STELLIFER*. Richardson.

Nasal teeth ten in one series, subulate, very acute, slightly compressed at the tips, and pretty tall. Three slender mesial teeth, the second and third very tall. One row of very short, moderately acute vomerine teeth. Palatine teeth biserial, twelve in the outer row, gradually augmenting in size towards the corner of the mouth, acute, lanceolate: inner row four or five slender, tall teeth. Mandible furnished on each limb with a series of about twenty or twenty-one lanceolate and very acute teeth, all reflex, the anterior ones smaller, but as closely set as the lateral ones.

Anus about one-twenty-fourth part of the length anterior to the middle of the fish. Fins conspicuous. Dorsal commencing before the gill-opening. Tail compressed, tapering, rather acute.

Colour of the specimen in spirits liver-brown, with four rows of rather widely-placed, pale bluish or whitish, round dots, a little radiated on their margins. The upper row is at the base of the dorsal, and is not very conspicuous unless when the fin is raised, the under one on the belly is regular, and the spots on the sides are very uniform in their sizes and distances. The dorsal and anal are very narrowly fringed with white or pale blue. Length 7·1 inches. To anus 3·3 inches.

This species differs from *bullata* in the spots being smaller, more regular and pale on a dark ground. Their serial arrangement and lesser number distinguish it from *punctata*. *M. tigrina* of Rüppell has ocellated dark spots on a pale ground.

HAB. Madagascar.

MURENA CANCELLATA. Richardson.

RADI:—Br. 10; D. 345; A. 236 = 581. Australian Spec.

Plate XLVI, figs. 1—5.

Schneider's description of *Gymnothorax favagineus* might be applied to this *Murena*, but his figure accords so ill with it in form, that I have not ventured to consider them to be the same species. McClelland's *Therodontis reticulata* agrees, however, with *favagineus*, both in general shape and in the character of the meshes, but it possesses two rows of vomerine teeth, whereas *favagineus* is ranged by Cuvier with the *Murenae*, having only one row,—but for this circumstance I should have been inclined, in the absence of authentic specimens, to have considered them as of the same species.

The specimen of *cancellata* which we have figured was procured on the coast of western Australia, by Surgeon Bynoe, of the Royal Navy. The British Museum possesses another from Cape Upstart, and also one from Sumatra.

Nasal marginal teeth ten, pretty tall, compressed, subulate and acute, with two minute ones between each pair. Three tall subulate and not compressed teeth stand on the mesial line overtopping the marginal ones. All the larger nasal teeth are attached to the orifices of deep holes in the bone. Six short-conical acute teeth form a single short series on the vomer. Palatine teeth about seventeen, close set, and much reflexed forming an outer series. They are narrowly lanceolate and compressed, with entire, acute edges. Two larger ones stand close within the commencement of the series, making a very short interior row. The mandible is armed by about twenty or twenty-one lateral teeth, similar to the palatine ones, and also by two or three on each limb near the symphysis, stouter and taller than the opposing marginal nasal teeth; and between each pair there are one or two minute, acute teeth, a little exterior to the centres of the large ones, as in the upper jaw.

This *Murena* is more compressed throughout than many others, and the compression increases as usual towards the tail. The dorsal is not enveloped in so thick a

fold of skin as in most, and is therefore more conspicuous. The posterior rays are longer than the height of the part of the body on which they stand, but owing to their oblique position the fin is not so broad. The dorsal at its origin before the gill-opening, above the fourth vertebra, rises in a low curve. The snout is obtuse, but being depressed below the swelling nape seems slender. Posterior nostrils not tubular. Eye moderately large. Lower jaw scarcely perceptibly longer than the upper one. Ten long, slender, or thread-like branchiostegous rays curve round the wafer-like operculum.

Body, tail and fins reticulated by white meshes, enclosing brown disks, which are mostly hexagonal, and number anteriorly five or six in the height of the body and fin, becoming gradually fewer as the fish tapers off in the tail. The Sumatran specimen in the British Museum, which was received from the College of Surgeons, has more regular and continuous meshes than are shown in our figure. The lines are wider at the angles of the meshes, and the brown colour of the areas is produced by microscopical, wavy bars on a paler ground. The belly is whitish, with a slight clouding.

The skull of this fish has a very slight, acute mesial crest, extending from the hinder point of the nasal bone to the occipital spine, and nowhere rising above its general level. The margin of the orbit is completed behind by rather stout, tubular, suborbital bones, but under the orbit and before it these bones remain membranous. The turbinate bones, as in the other *Murenae*, are long, narrow and thin, flanking the nasal ridge. The nasal disk is perforated by numerous holes, on which the teeth stand, and seems as if it had a double floor.

There are fifty vertebrae anterior to the beginning of the anal, and about seventy-seven posterior to it, or about 127 in all. Twelve next the cranium have, in addition to the transverse parapophysis, a thin spine descending from the under mesial line of the centrum. This spine or crest is highest at the third or fourth vertebra, and diminishes gradually to the twelfth. Posterior to that the under angles of the parapophysis gradually approach each other beneath, forming a deep hæmal canal, and at the termination of the abdominal cavity a central, under-process is formed as it were by the union of the under angles of the parapophyses, while the upper angles retain their horizontal direction, and gradually diminish in size as they approach the end of the tail. A long series of ribs reaching from the cranium nearly to the tip of the tail, is attached to the centra of the vertebrae above the parapophyses, through the medium of membrane; and from the beginning of the anal to the end of the tail a similar series is attached to the centra between the lateral and inferior parts of the parapophyses. These ribs are stontest about the middle of the tail, and have each a forked end next the centrum, the short limb of the fork forming a knob or head. The interneural processes correspond in number with the dorsal rays, and the rays of both fins, though fissile at their tips, are not jointed.

Stomach a long, wide, caecal tube (measuring in the specimen here described 5·6 inches from the gullet to the point of the sac), plaited longitudinally within, in about ten

fine folds. Pyloric orifice lateral, near the œsophagus, opening directly into a much more slender intestine, which lies parallel to the stomach. The intestine is reticulated interiorly, the wrinkles becoming gradually more delicate, and disappearing in the lower part of the canal. At the junction of the small intestine with the wider rectum its inner coat projects so as to form a circular valve, but the gut was not in a condition to enable me to ascertain whether a complete spiral valve existed or not. Air-bladder of a long-oval form, an inch in length.

Length 17·5 inches. To anus 8 inches. To gill-opening 2·45 inches.

Obs.—McClelland characterises his *Therodontis reticulata* (which we have supposed may prove to be identical with the *Gymnothorax favagineus* of Bloch), as follows: "Teeth sharp and hooked, consisting of a single row on the edges of both jaws, and a double row on the centre of the back part of the palate, with three moveable fangs near the apex of the upper jaw. Crown high and rounded, every part of the body marked with black, pentangular spots, separated by narrow white lines." (Calcutta Journ. of Nat. Hist. July, 1844).

#### MURENA TESSELLATA. Richardson.

*Murena tessellata*, Richardson, Ichth. of Voy. of Sulphur, p. 109. Plate IV. fig. 5—8.

Nasal teeth twelve, uniserial, subulate, very acute, not tall. Three teeth on the mesial line of the disk, the posterior one being the tallest in the mouth, stontish at the base and very acute. Vomerine teeth uniserial, short, acute. Palatine teeth ten in the outer series, more compressed than the nasal ones, very acute and reflex, forming a slightly arched row; inner row of two taller ones at the fore end of the bone. Each limb of the mandible is armed anteriorly by three tall teeth, like the nasal ones, the second being the stoutest and tallest, and in the same line, by fourteen lateral teeth, which are subulate and reflex, the foremost being smaller than the rest. The mandible is slightly concave or recurved.

This *Murena* has a different form from *cancellata*, a more obtuse snout, a full and not concave profile, a shorter gape, smaller eye, lower dorsal fin, and different colour, with fewer and larger meshes formed by the white lines. The meshes are much less numerous than those of *favaginea*. The dorsal commences before the gill-opening, and the vent is about one-fiftieth of the whole length before the middle of the fish. The posterior openings are not tubular.

One specimen exists in the Museum of Haslar Hospital and another was presented to the British Museum by the College of Surgeons. They are supposed to have come from the southern seas, but the place of capture of either is unknown.

Length, total	....	9'04	13'5
" to anus	....	4'20	6'5
" to gill-opening	....	1'00	0'82

#### MURENA COLUBRINA. Commerson apud Lacep.

*Murena fasciata*, Banks et Solander, MSS. p. 68?  
*La Murenophis colubrina*, Lacep. v. p. 641. 642.

#### Plate XIX., fig. 1.

A *Murena* taken among the Society Islands on Cook's first voyage is briefly noticed in Solander's notes, as follows: MURENA FASCIATA, tota fasciata, fasciis latis ex albido cinerascens, fasciæ duæ in capite lutescentibus. Iris argenteo-fuscens. Pupilla nigra. Fasciæ per pinnas extenduntur." Native names "Epui-eaahu." Except in the existence of the bands there is little in this notice to identify it with a banded *Murena* which the British Museum received from the College of Surgeons. The origin of the specimen is not recorded, but it was associated in the collection with some fish collected on Cook's voyage. Lacepede's figure of *M. colubrina* represents our fish pretty well, and shows the fins fringing the point of the tail, yet in the 'Règne Animal' it is quoted as specifically the same with the *Murena annulata* of Thunberg, which is an *Ophisurus* with double the number of black rings on the body.

Nasal teeth twelve, slenderly subulate and very acute, in one series. Three taller ones on the mesial line of the disk, and nine very low, small, bluntish teeth in a single row on the vomer. Palatine teeth biserial, outer row of twelve or thirteen teeth, which are narrowly lanceolate, very acute, low, and much reflexed: the inner row consists of four tall, slender teeth, standing opposite to the commencement of the outer row. Each limb of the mandible is armed by twenty-four acute, compressed teeth; three of which near the symphysis are set alternately with two minute ones: the following teeth are similar in height, regularity and inclination to the outer palatine ones.

Jaws equal. Posterior nasal opening with tumid lips, placed very near the superior anterior margin of the orbit. The anterior ones end in rather long tubes. Body considerably compressed, particularly posteriorly, the tail tapering, and ending very acutely. Anus about one-fourteenth of the whole length before the middle of the fish. The dorsal fin is very conspicuous, and the fold of skin in which it lies is thinner than usual in the *Murena*, so that the rays can be readily seen when it is held up to the light. They are not, however, easily reckoned, owing to their tenuity, and they are shorter at the tip of the tail than on the back. The reticulations of the skin produced by the muscular fasciuli are very fine, and the lateral line is imperceptible, though there is a furrow where the muscles of the side meet.

The ground colour of the specimen, which has been long macerated in spirits, is brownish, that of the fins being pale yellow or soiled white: both are crossed by fifteen very regular and neatly-defined black bars, not so wide as the interspaces. The first bar includes the eye, the second is immediately behind the mouth, the third passes over the gill-opening, the seventh is just before the anus, and the last is on the end of the tail, leaving only the white tip of the fin beyond.



The bars contrast more strongly with the pale fins than with the browner body. Length 8·4 inches. To anus 3·6. To gill-opening 1 inch.

HAB. New Britain, Amboyna (Commerson apud Lacepede). Polynesia? (Solander).

Solander also describes a *M. vittata*, but this derives its name from a longitudinal stripe.

"*MURENA VITTATA. Pisci supra intense e fusco brunneus, vitta secundum medium dorsum e flavo albida, a capite usque ad finem caudae, subtus infra lineam laterali totus sordide e lateo albescens. Oculi minuti. Iris flavo-aurae. Pupilla nigra.*" "*Eualtha* aboriginorum. (Banks et Solander, MSS. p. 78.)

(HAB. Society Islands.

#### MURENA MORINGUA, Cuv.

*Murena maculata, nigra et viridis*, Catesby, t. 20.

*Murena moringua*, Cuv. Reg. An. 2. p.

RADI:—D. 323; A. 232 = 555 (Jamaica spec.).

Nasal teeth twelve, tall, stoutly subulate, compressed, with sharp edges, and generally two minute teeth between each pair, all in one row. Three mesial teeth, and nine very acute, shortly subulate vomerine teeth in one row. Palatine teeth eighteen or nineteen, much compressed, acute and reflex, the anterior three small, and succeeded immediately by the tallest in the row, the following ones decreasing as usual towards the corner of the mouth. In one specimen there is a tall, slender tooth within the commencement of the outer row, but this is absent in five or six other specimens, having probably been broken away. The mandible is armed anteriorly by three tall, stout, subulate teeth on each limb, with two or three minute ones between them, and laterally by about nineteen compressed, acute teeth, forming an even, low series.

Dorsal commencing between the nape and gill-opening. Anus about a twenty-fourth part of the total length before the middle of the fish. Gape of the mouth large.

Ground colour pale, with dark, liver-brown spots of various sizes, from that of a pea downwards, and more or less confluent, but generally retaining a roundish form. The spots are smaller, rounder, and more distinct on the head and more confluent near the end of tail, the pale ground colour occupying, however, everywhere except on the cheeks less space than the spots. The tint of the spots is less deep on the belly.

Length 23·5 inches. To anus 10·75 inches. To gill-opening 3·4 inches. The species attains the length of upwards of three feet.

Cuvier refers to the *Murena maculata, nigra* of Catesby, t. 21, as the type of his *moringua*, but t. 20 agrees best with most of the specimens we have examined. There is, however, no very marked difference between the figures, both being coarsely drawn. The British Museum possesses a dried skin in which the pale interspaces are narrower, and reduced nearly to the winding reticulations of *M. thyrsoidea*.

HAB. The Bermudas, Gulf of Mexico, and Caribbean Sea.

MURENA LINEO-PINNIS. Richardson.

RADI:—circiter D. 320; A. 160; = 480.

Since the preceding sheet went to press, the British Museum has purchased from Herr Brant, of Hamburg, a South American *Murena*, labelled *Murenaophis saga*, but which is evidently widely different from the *Nettastoma saga* of Rafinesque and Risso (vide p. 96).

About ten pretty tall, compressed-subulate, very acute, uniserial nasal teeth, and an equal number of small teeth in the intervals. Three taller mesial teeth, and seven or eight small acute vomerine ones, set alternately a little to the right and left, so as to approach a biserial arrangement. Fourteen narrowly lanceolate palatine teeth, the three anterior ones being small, the middle ones larger, and the posterior ones decreasing gradually as they approach the corner of the mouth. A single very slender, and not tall, moveable interior tooth, at the fore part of the bone, renders the arrangement biserial. The fore part of the mandible is armed, on each limb, by four or five tall stout teeth, with a small and rather more exterior one in each interval. These are followed on the sides of the bone by six small, close set, acute compressed teeth, and in succession by ten larger reflex, narrowly lanceolate ones, which are sensibly larger the nearer they are to the corner of the mouth.

This *Murena* is considerably compressed, with a swelling throat, a pretty large gape, and the dorsal commencing by an abrupt curve about midway between the eye and the gill-opening. The fin is high, and the investing fold of skin being rather thin its rays are more than usually visible. The anus is one-eleventh of the whole length of the fish anterior to the middle. Colour, after maceration in spirits, purplish- or brownish-black, without spots, the ventral surface being paler. The dorsal is traversed by fine oblique lines of a darker hue, for the most part seven or eight in the height at any one point. The anal, which is low, has fewer lines, and the two fins are narrowest at their union round the tip of the tail. The folds of throat are marked out by fine black lines.

Length 22 inches. To anus 10·5 inches. To gill-opening 2 inches. Height of body 1·25 inch. Circumference 3 inches. Height of dorsal fin 0·75 inch.

HAB. Puerto Caballo.

MURENA GRISEO-BADIA. Richardson.

One row of close set, conico-subulate, nasal teeth, fourteen or sixteen in number, the four posterior ones on each side bent backwards at their middles. Two tall, slightly recurved, moderately acute teeth on the mesial line; and about eleven small, round and obtuse vomerine teeth in one row, but two of them standing a little out of line. Palatine teeth biserial: the outer row composed of fourteen close set, low, even, bluntish teeth; the inner one of

eleven taller, more distant, slenderly subulate, but not very acute teeth. Fore half of the mandible armed by two rows of teeth; the outer row consisting of ten or eleven close set low teeth, having compressed but not pointed tips; the inner row of five or six taller ones, of which the two or three posterior ones are bent back and are more acute. The posterior half of the jaw is set with low bluntish teeth, alternating with others a little taller, somewhat recurved, and standing a little within; but the two sets are so close that until very narrowly examined they appear to form one uneven row.

A slender species. Posterior nostrils not tubular. Under jaw shorter than the upper one. Anus exactly in the middle of the length. Colour liver-brown, finely reticulated by grayish-white lines, forming small meshes, which are roundish near the head and squarish elsewhere, but they are not very visible unless when examined with the aid of a lens, the general tint appearing to the naked eye grayish-brown.

Length 6·2 inches. Distance between the end of the snout and the anus 3·1 inches. Distance from ditto to gill-opening 0·73 inch.

HAB. Tonga Islands (Dr. Mc William).

The only spotless *Murena*, mentioned in Solander's notes of the fish observed by him in the South Sea, is the *M. erythroptera* quoted below.

#### MURENA PAVONINA. Richardson.

*Murena pavonina*, Richardson, Voy. of Sulphur, p. 110, pl. 53, f. 1-6.

Ten or twelve moderately tall, slightly recurved, acute, uniserial, nasal teeth, with a minute tooth in each interval. Three teeth on the mesial line, the posterior two being, as usual, the tallest in the mouth. The vomerine series, commencing at a considerable distance behind these, is composed of five or six acute teeth. Palatine teeth biserial; sixteen or seventeen in the outer row, compressed, subulate and acute; with six tall, slender and acute ones, more widely set in the interior row, which reaches about halfway along the outer series. Each limb of the mandible is armed by about nineteen subulate, slightly recurved teeth, forming the exterior row, with a second row at the fore end of the limb, composed of four tall, slender, acute teeth.

Body high and much compressed, with a broad dorsal, which commences at a considerable distance before the gill-opening, and becomes comparatively very narrow as it rounds the end of the tail to join the anal. The gill-opening is one-seventh of the whole length distant from the end of the snout, and the vent is one-twentieth of the length before the middle of the fish. The posterior openings are tubular, forming long barbels; the anterior ones are more shortly so, and two pores at the ends of both jaws are also prolonged into short tubes.

Colour pitch-black, varied by regular oval spots, shaded with brown. The spots are smaller on the head and fins.

Length 9·6 inches. To anus 4·4. To gill-opening 1·4 inch.

HAB. Southern Seas.

This species would be readily distinguished from the *Calamania paum* of Russell, or *punctata* of Schneider, by the form of the spots, were they uniformly as large and regularly oval, as in the example figured in the 'Ichthyology of the Voyage of the Sulphur.' But the British Museum possesses a dried skin of a murey measuring 27½ inches, which has small round spots, like Russell's fish and the high barbels at the eyes of *pavonina*. Its general appearance corresponds with that of the latter, but there is only one row of palatine teeth, though the month being injured makes it probable that the interior row may have been broken away.

#### MURENA GUTTATA. Solander.

*Murena guttata*, Banks et Solander, MSS. Icon. pict. Parkinson, ii. 1. Bib. Banks. Low, Fishes of Madeira, Tr. Zool. Soc. ii. p. 192.

Solander, on Cook's first voyage, observed this fish at Madeira and Rio Janeiro, and drew up the description which is transcribed below, and Parkinson made a drawing, which is preserved in the Banksian Library. The species does not appear, however, to have been admitted into our systematic works until the Rev. Mr. Low published it in the Zoological Transactions, under a specific appellation, which, though borrowed from Risso, is happily the same with that originally given by Solander. Risso's *guttata* is, according to the Prince of Canino, a variety of *helenae*, from which Solander's fish differs in its biserial palatine teeth. The *Murena guttata* of Forskal and Schneider has pectorals, and is the *Haliophis guttatus* of Rüppell.

"*M. GUTTATA, pinnis pectoralibus nullis, pinna dorsali prope caput incipiente, corpore spadiceo punctis albis guttato.* 'Morea Lusitaniae Maderensibus. Habitat ad insulam Maderam Oceano Atlantico, etiam in Portu Fluvii Sancti Januarii in Brasilia.'—'*Corpus longum, parum compressum, nudum pone caput tumidiusculum. Caput parvum, conicum, antice compressum. Dentes in maxillis et palato omnes discreti conico-subulati, acutissimi, majusculi, inaequales: maxillae inferioris unico ordine dispositi, fixi; maxillae superioris duplici serie collocati, exteriores fixi, interiores flexiles. Palati pauci majores, flexiles. Oculi majusculi cute capitis communi tecti. Pupilla nigra. Iris griseo-argentea. Annulus marginalis, glaucus. Nares ex uno utrinque foramine parvo, rostro proprio, tubuloso. Tentacula quatuor lanceolata, compressa, breviora, duo in apice rostri, duo supra angulos anticos oculo-rum. Pori seu foramina parva 6 utrinque in mandibula superiore. Primus sub angulo postico oculi; secundus sub angulo antico; tertius sub nare; quartus sub basi tentaculi; uti sextus prope apicem rostri. Pori sex in maxilla inferiore, fere in eodem ordine dispositi et praeter hos porulis plurimi ad ipsam marginem maxillae.'*"

"*Spiraculum nuncium utrinque in medio latere, mox pone caput, oblongum, horizontale. Linea lateralis recta, dorso paulo propior. Anus capite paulo propior. Pinna nuda in toto pice, carnosus, crassiuscula, cute tenaci induta, ambiens (a pinnis dorsi, caudae, unigue coadu-*

*natij), mox pone caput incipiens, dein per totum dorsum extenditur, cui adnectitur et iterum subius ad anum usque revertitur: ipsa cauda valde compressa est et obtusiuscula.*"

"*Color totius piscis spadiceus, maculis parvis obscurioribus inequalibus sed non transversalibus, et punctis seu guttis albis numerosis undique adspersis.*"

"Diam. Long. 30 unc. Perpend. 2 $\frac{1}{2}$ . Horizont. 1 $\frac{1}{2}$ ."

Nasal teeth in two series, so closely approximated that they appear, until narrowly examined, to be in but one. The outer row is composed of about nine, very short, stoutly subulate acute teeth, alternating with an inner row of eight taller, conico-subulate, very acute ones, which are irregular in height, and variously recurved and reflex. The mesial line of the disk supports three tall stoutly subulate teeth, and on each side of the hindmost of these there is a tooth equally tall, and almost filling the space between it and the marginal rows. There are also several smaller and shorter teeth scattered over the disk, so that in this species the nasal bone is pre-eminently denticiferous. Vomerine teeth eleven, uniserial, short, and compressed at the tips, but not pointed. Palatine teeth biserial; the outer row consisting of fourteen short, slightly recurved and reflex teeth, which diminish gradually in size from the fifth or tallest to the corner of the mouth: the inner row is some distance from the outer one, and reaches nearly as far back; it is formed by eight taller and more distant subulate teeth. Each limb of the mandible is armed by about twenty-one acute teeth, all in one row, mostly recurved and slightly reflex. The anterior teeth are rather the longest, but there is no abrupt transition in the series.

Head small, gape large, with the eye placed decidedly before its middle. Posterior nostrils not tubular. Anus exactly in the middle of the length. The specimen is so much stuffed that the origin of the dorsal cannot be made out, but posteriorly the fin appears to have been high. The anal is sufficiently conspicuous.

The ground colour of the dried skin is dark purplish-brown, and it is regularly marked by pale round dots, the largest not exceeding the size of the head of a small pin. The dots are biggest and most crowded on the head and fore part of the body, where they occupy fully more space than the ground colour. Posteriorly they are farther apart, and are surrounded by dark borders, and towards the end of the tail they are not only more distant but also decidedly less. They are smaller throughout than the spots of *punctata* of Schneider, and still more so than those of *pavonina*.

Length 40-25 inches. To anus 20-15 inches. To gill-opening 5-5 inches.

HAB. Madeira. Brazils.

#### MURENA THYRSOIDEA. Richardson.

*Murena thyrsoides*, Richardson, Ichth. of Voy. of Sulphur, p. 111, pl. xlix. fig. 1. Report on the Fishes of China, to Brit. Association.

Twelve nasal teeth in one series, moderately high, rather closely set, conico-subulate, not very acute. Three tall,

slender teeth on the mesial line. Vomerine teeth biserial, short, not very acute; first tooth of each row the largest. The rows are farthest apart anteriorly, and approximate posteriorly. Palatine teeth biserial; the outer row constituted by ten much shorter compressed teeth; the inner row by eight more slender and taller subulate ones, which extend as far as the outer row. Each limb of the mandible is armed by eighteen or nineteen conical acute teeth, with an interior row at the fore end of the jaw.

Body high and considerably compressed, with a deep dorsal which commences before the gill-opening, the loose fold of skin which invests it extending forwards to the head. End of the tail rounded. Posterior nostrils not tubular. The reticulations of the skin are coarser than in most other species. Anus one-thirteenth part of the whole length before the middle of the fish.

The colour is a dark purplish-brown, with irregular zig-zag lines of a pale colour, forming reticulations. The figure in the Ichthyology of the Voyage of the Sulphur was taken from a drawing executed under the eye of Mr. Reeves, at Canton, but the specimen presented by that gentleman to the British Museum has much coarser pale lines, with dilations at the points of intersection.

Length 26 inches. To anus 11 inches. To gill-opening 2-6 inches.

HAB. Sea of China. Estuaries.

#### MURENA SATHETE. Hamilt. Buchan.

*Murena sathete*, Hamilton Buch., Ganges p. 17 et p. 363. Icon. Hardw. ined. No. 308, upper figure.

Nasal teeth twelve or fourteen in one marginal series, each curved backwards so acutely as to form a slight notch in the middle of the posterior side; their cusps being compressed but not pointed. Two stout conical and not acute teeth stand on the mesial line of the disk, and the vomerine teeth are disposed in two lines, which coalesce behind, each line containing six or seven small rounded teeth, headed by one larger than the rest. Palatine teeth in two rows; the outer row composed of twelve, smaller than the nasal teeth, and more closely set, but of similar form and curvature, having their cusps, however, more compressed and acute edged; the inner row contains ten or eleven taller and more slender cylindrical teeth, with acute but somewhat oblique cusps. The mandible is armed on the two posterior thirds of each limb by eleven or twelve similar to the exterior palatines, and on the anterior third by two rows; the outer row consisting of eight conical or cylindrical and rather obtuse teeth on each limb, smaller than the lateral ones; and the inner row of about five rather longer than the latter, but similar in form.

Tip of the tail rounded. Dorsal commencing about half-way between the gill-opening and the nape. The colours of the specimen in the British Museum, which is a dried skin, have faded, but the drawing exhibits a brown fish with dull yellow throat and belly. The lateral line is strongly shown by a series of silvery dots, and the dorsal is grayish-purple. In the dried skin some of the pores

have become deep black dots, of which one series can be traced over the gill-opening, and a short way along the side, in the course of the lateral line; another row runs from the angle of the mouth over the branchial membrane, and there are a few pores under the jaw.

Length 32.5 inches. To anus about 15.5 inches. To gill-opening 3.6 inches.

HAB. India.

#### MURENA GRACILIS.

Two examples of this fish in the British Museum accord well with drawing 303 in Hardwicke's collection.

Nasal teeth subulate and acute, in two rows; those of the outer row very small, and situated at the bases of the inner row, which are taller and stouter. Three subulate teeth on the mesial line of the disk, and two rows of short, conical, tapering acute vomerine teeth, set alternately. Palatine teeth in two rows; those of the outer row about nineteen or twenty in number, short, erect, compressed; the inner row consisting of about ten taller, slender, slightly recurved and acute teeth. About nineteen rather acute lateral mandibular teeth are arranged in an even, crowded series, with two rows at the end of the jaw; the outer row being composed of teeth smaller than the lateral ones; and the inner row of about six on each limb, a little taller and stouter than the nasal ones, and increasing gradually in height as they recede from the symphysis.

This is a slender species, with a rather small mouth, and the under jaw somewhat shorter than the upper one. Several Indian species have similar mouths. The snout is obtuse, the profile rather hollow at the eye, the hind head full and convex, and the tail considerably compressed, the body only moderately so. The dorsal commences over, or a very little before, the gill-opening. The anus is placed just before the middle. The colour of the specimens in spirits is brownish, with pale round dots, not so big as the head of the smallest-sized pin, scattered over the body and fins, and one of them has also a few paler blotches, about the size of a very small pea.

Length, total . . .	11.25	10.0
" to anus . . .	5.86	4.9
" to gill-opening . .	1.35	1.2

The specimens were brought from India by General Hardwicke, and his drawing appears, from the style of its execution, seems to have been made by one of Hamilton Buchanan's artists.

HAB. India.

Another drawing in General Hardwicke's collection (No. 308 under figure) is marked "M. H. B. Oct. 3, 18, *M. tile baim*," and is doubtless a representation of the *M. tile* of Hamilton Buchanan. It is a compressed and rather deep-bodied species, with the reticulations of the skin stronger than usual; hence they are noticed in the character of the species given in the Gangetic fishes. The dorsal commences before the gill-opening, and the anus is a little behind the middle. The fins are rather high, and

are of a dark neutral tint speckled with yellow. We have seen no specimens corresponding with this drawing. *Strophidon punctatum* and *St. literatum* of McClelland have their dorsals commencing nearer the head than in *gracilis*, *vermiculata*, or *tile*.

#### MURENA VERMICULATA.

*Murana*. Icon. Hardw. ined. 310.

Marginal nasal teeth in two series, so closely situated as to look like one. Outer row composed of twelve or fourteen very short acute teeth; inner row forming a semicircle, at the end of the jaw, of conico-subulate very acute teeth; the tooth on each side of the symphysis smaller than the rest. Three subulate teeth on the mesial line of the nasal disk; and about twenty-two short, stoutish but acute vomerine teeth, set alternately a little to the right or left, so as to make two irregular rows. Two rows of palatine teeth; those of the outer row, which does not reach to the corner of the mouth, nineteen in number, closely set, short, even, compressed and moderately acute; inner row consisting of nine taller, subulate, and very acute teeth, set more widely, but not extending beyond two-thirds of the length of the outer row. Each limb of the mandible is armed by about twenty-four teeth, the lateral ones disposed in an even series: at the end of the jaw there are two rows, the outer one composed of numerous low teeth, and the inner one of taller and more widely set teeth; but this part of the jaw having been injured in both specimens, their exact number cannot be ascertained.

This fish is slightly compressed anteriorly, but becomes considerably more so in the tail, which has an obtuse tip. The snout is blunt, and a little longer than the lower jaw; the nose horizontal, with a concavity in the profile over the eye, and a sudden rise in the back of the head and nape. There is also much fullness in the throat. The dorsal which commences over the gill-opening is low anteriorly, and highest in the tail, but is sufficiently conspicuous throughout. The anus is placed about the thirty-second part of the whole length before the middle of the fish.

In colour and markings this species has some resemblance to *M. melagris*, but the spots are smaller. The general tint is between dark hair-brown and wood-brown, studded with little grey specks of angular, round, oblong, conjugated or crescentic forms, mixed with others so minute as to be scarcely perceptible to the naked eye. The throat and fore part of the belly are of a livid white colour, without spots, but towards the vent the white is faintly mottled with pale grey.

A specimen of this *Murana* which was bequeathed by General Hardwicke to the British Museum agrees with *M. gracilis* in its dentition, and differs from it chiefly in being thicker about the throat and head, tapering more in the tail. The patterns of the spots are also different. It may, however, be that species better fed and grown to a greater size. I am not altogether convinced that this *Murana* and *gracilis* are distinct from Buchanan's *tile*,



yet I cannot reconcile them with the drawing of *tile*, 308, which is authenticated by a reference to Buchanan.

Length 17·8 inches. To anus 9·25 inches. To gill-opening 2·2 inches.

HAB. India.

#### MURENA MELEAGRIS. Shaw.

*Murena meleagris*, Shaw, Nat. Misc. pl. 220. Gen. Zool. p. 32.  
*Murena pintade*, Quoy et Gaimard, Voy. de Freycenet, pl. 52, f. 2.

Nasal teeth stoutly subulate, biserial; the outer row composed of teeth unequal in height, but none of them very tall; the inner row consisting of taller teeth ranged in a semicircle. Three teeth on the mesial line of the disk, the foremost being the tallest, and ranging with the interior marginal row. Vomerine teeth conico-subulate, short and acute, disposed in one row anteriorly, but separating into two posteriorly. Palatine teeth about fifteen in the outer series, close set and reflex; the first four augment successively in height, the fourth being the tallest in the series; the succeeding ones are considerably shorter, and diminish gradually in size as they approach the corner of the mouth. The inner series stands at some distance from the outer one, and is composed of eight tall widely set teeth. At the fore part of the bone there are two teeth, of intermediate height, between the rows, making three rows there. Mandible a little recurved, and armed on each limb by twenty-eight acute, slightly recurved teeth, of unequal height, the inequality being greatest among the anterior ones. At the end of the jaw there is an inner semicircle of taller teeth, not far removed from the outer one.

Eye rather before the middle of the gape. Snout bluntish, with the head apparently gibbous in front. Body high and compressed. Posterior nostrils not tubular. Dorsal commencing a very little before the gill-opening. Anus one-thirteenth of the whole length, before the middle of the fish.

The colours of the specimen have partially perished, but where they remain the ground tint is a rich chestnut-brown, thickly studded with small pale spots, placed at pretty regular distances in each locality. On the fore part of the body they are mostly angular, lunate, or oblong; on the tail rounder and more distant, and none of them exceed the head of the smallest pin in size. They extend to the end of the snout.

Length 20 inches. Length from end of snout to anus 9·35. Length from ditto to gill-opening.

This description is drawn up from Shaw's specimen preserved in the British Museum.

HAB. Southern Ocean (Shaw).

#### MURENA PRASINA. Richardson.

A dried skin of this species, existing in the British Museum, was brought from Australia by Mr. Mc Gillivray.

This gentleman says that it frequents "weedy pools among the rocks on the north side of Bondy Bay, near Sidney." It is very savage when irritated, and once while I was collecting corallines in that locality a large individual made a dart at my arm, and returned repeatedly to the attack, swimming slowly about, winding among the sea-weed, and raising its snout to the surface. This one measured  $31\frac{1}{2}$  inches to the tip of the tail,  $15\frac{1}{2}$  to the anus. Its depth behind the head was 2 inches, its breadth  $1\frac{1}{2}$ , and its circumference  $5\frac{1}{2}$ ." (Mc Gillivray).

Eye moderately large over the middle of the gape. Teeth acute. Nasal ones biserial, but some are broken in the specimen. Outer series consisting of about twelve small acute ones; inner series of about seven or eight tall, stoutly subulate, and much compressed teeth, the two rows contiguous and partially blended. Mesial row slender and subulate, not acute edged, the third one very tall and recurved. Vomerine teeth biserial in front, about six in each row, uniting to form a single row of about seven, all small and cylindrical, with conico-subulate cusps. Palatine teeth biserial; outer row composed of about fourteen reflex, lanceolate teeth, with acute oblique tips. The inner row is constituted by three tall, slender, subulate and recurved teeth, standing opposite to the fore part of the outer row. On the fore quarter of the mandible there are on each limb seven or eight small exterior teeth, with four or five tall, recurved, stoutly subulate, interior ones, the penultimate one of these being the largest. Most of the larger teeth of the jaws have a minute notch in the middle of their posterior edge, and some have also a notch in front. The dorsal fin is not high, commences about halfway between the occiput and gill-opening, and contains 356 rays to the apex of the tail. The rays at the end of the tail are short, very slender, and much crowded. The anal fin has been removed from the specimen.

Mr. Mc Gillivray says that the colour was a "nearly uniform pale green, changing after death to dark brown. Several long interrupted dark streaks run along the throat, which, together with the neck, is minutely marked, for the most part perpendicularly, with short waved striae of pale brown."

Length  $23\frac{1}{2}$  inches.

HAB. Australia.

OBS.—The *Murène linéolée* and *M. flareolée* of Lesson are represented as having much higher dorsals. (La Coquille, Plate 11, f. 1 and 2). The *Gymnothorax wilsoni* of Schneider (p. 529), which is a New Holland species, locally known by the name of "Banning," is ornamented with broad roseate spots.

#### MURENA OPHIS. Rüppell?

*Murena ophis*, Rüppell, Atl. t. 29, f. 2?

About ten marginal nasal teeth, conical, subacute, and hooked backwards, with a posterior basal lobe, all slightly compressed, but having rounded edges. Mesial teeth ab-

sent in the specimen. Palatine teeth nine, in one unusually short row, the three central ones hooked and shaped like the nasal ones, but much smaller; the three anterior and three posterior ones still smaller and cylindrical, with not very acute points. Vomerine teeth in two rows, well separated anteriorly, but meeting behind; each row containing about nine short cylindrical teeth, with rounded cusps. These rows are twice as long as the palatine row. The lower jaw is armed with two rows of teeth, the outer one consisting of small low teeth with flatly rounded cusps. The inner row commences anteriorly with two taller and stouter cylindrical teeth, having slightly compressed cusps, followed by two teeth still more tall, which are strongly hooked back, and have acute cusps and posterior basal lobes; after which there is a close set, even series of cylindrical teeth, having rounded or slightly compressed cusps, considerably above those of the outer row. The dentition of this species has a resemblance to that of *M. variegata*, but differs in having the strongly hooked acute teeth. The corresponding teeth of *variegata* are more obtuse, and but very slightly curved. In the only specimen we have seen, which is a dried one, the vent is about one twenty-fourth part of the whole length past the middle.

The markings are well represented in Rüppell's figure of *M. ophis*, but as he describes the teeth as cutting, which scarcely agrees with our specimen, I cannot feel confident in quoting him. *M. similis*, p. 83, which has subulate and lanceolate teeth, closely resembles both this fish and Rüppell's drawing in its markings, but its gape is considerably larger. The ground colour of the dried skin of the British Museum specimen has a yellowish tint, and is mottled with small brownish-black specks, of various forms and often confluent, and by two rows of large black marks, which are more or less dotted with specks of the pale ground colour. There are about twenty-one or twenty-two spots in each row, the rows touching those of the opposite sides of the fish on its dorsal and ventral surfaces. The edge of the anal is pale. The vent is about a twenty-fourth part of the whole length past the middle.

Length  $25\frac{1}{2}$  inches.

HAB. Mauritius. Red Sea?

#### MURENA VARIEGATA. J. R. Forster.

? Seba Thes. 69, f. 1, 17.

*Murena geographica*, Banks et Solander, MSS., 1769, Icon. Pict. Parkinsonii, 3. ("Pepellio.")

*Echidna variegata*, Icon. ined. Georg. Forster, Bibl. Banks. 172. An. 1777.

"*Echidna variegata*, J. R. Forster, Enchiridion, 31, Genus 5. An. 1788." Id. Animal cura Lichtenst. p. 181. An. 1844.

*Murena nebulosa*, Thunb. dissert. p. 7, tab. 1, f. 2. An. 1789.

*Gymnothorax nebulosus*, Bl. Schn. p. 528. An. 1801.

*Gymnothorax echidna*, Id. p. 526.

*Murena*, Hardw. Icon. ined. Mus. Brit. pl. 306.

#### Platc XLVII., figs. 1—5, and figs. 11—16.

About twelve marginal, scarcely acute nasal teeth, some of them very slightly curved backwards, ranged in an oval, which is completed behind by the vomerine teeth. The

mesial line of the disk is occupied by two stout, conical, subacute teeth, rather taller than the others; and the vomer is armed by two rows of low teeth, having slightly compressed cusps. The rows meet in a point posteriorly, and diverge anteriorly, on the angles of the vomer, so as to fill up the posterior part of the nasal oval. Palatine teeth about nine, small, very closely set, in a short even row, and having somewhat compressed or bluntly chisel-shaped, somewhat oblique cusps. Mandible armed laterally, on each limb, by twelve or thirteen even teeth, with flattish or rounded crowns and cylindrical bodies. In some specimens an exterior row runs along the whole limb, in others it is shorter, and in others again it can be traced only in the anterior quarter of the jaw. The tooth next the symphysis, standing in this exterior row, is larger than the rest, and is followed by two or three taller conical inner teeth, seemingly a continuation of the principal lateral row, but placed wider apart.

This is either an abundant species, or from its beauty it is sought for by collectors, for many examples of it exist in Museums. Great variety exists in the form and distribution of the spots in different individuals. The specimen figured in Plate 47, fig. 1, after long maceration in spirits, has a pale yellowish-gray or cream-coloured ground tint, with two rows of purplish-brown spots. These spots radiate into irregularly tortuous, divaricating, forked branchlets, and their disks are pierced by one or many dots of the ground colour. The upper row, consisting of smaller spots, runs on the dorsal fin and top of the back, the lower one on the sides, and they coalesce in a solitary spot at the end of the tail. Their number varies from twenty to twenty-four in each row, and in the specimen we have figured a third row is indicated by two or three spots on the belly. The ground colour is further varied on the back by many detached lines and specks, bearing some resemblance to Arabic characters. Solander observed this variety in the sea, at Ulhietea, and describes its colours as follows: "*M. GEOGRAPHICA, tota alba, punctis maculis lineariibus rivulisque ornata. Rivuli confluentes in areas rotundas flavedine immixtas. Caput supra gibbosum. Iris aureo-lutea. Pupilla nigra. Maxillæ circa os albæ immaculatæ. Foramina sperne in naso tubulosa, lutea: foramina etiam interocularia lutescentia. Piscis certè pulcher.*" Parkinson's figure is unfinished, but sufficiently characteristic. The name, in the language of the Society Isles, is written in the MSS., "*Pipirho*," "*Pipiro*," and "*Pipirha*." Hardwicke's drawing also represents this variety.

The individual represented in figure 11 has three rows of spots, the lower row, which ceases about half-way between the vent and the point of the tail, being composed of spots which do not branch like the others. The ground colour is also everywhere thickly marked with black specks, except on the belly, where the specks are few. The under surface of the belly, before and behind the vent, is represented in figure 15. The Forster's observed this variety at Otaheite, and George Forster's drawing differs only in showing fewer ventral spots. The native name of "*Pipiro*" is written on the drawing, and in the *Descript. Animal.* it is said to be also called "*Boohëe*." The colour is described thus: "*Color totius corporis lutescentis albus,*

*lineis, punctis, maculisque fusco-nigris variegatus. Abdomen album, maculis fuscis subfasciatum.*" (Forster lib. citat.)

Of fourteen specimens of these varieties, no two exactly resemble one another in their markings. The dorsal begins before the gill-opening in all, and the anus is nearly median, being in one a little before the middle of the fish, but in most a little behind, not however exceeding a twenty-fourth part of the whole length. As in all the blunt-toothed *Muraenæ*, the gape of the mouth is comparatively small.

The length of the specimens varies from 5 to 20 inches.

HAB. Indian Ocean (Hardw.) Chinese Sea (Belcher). Coasts of Australia (Brynoe). Polynesian Archipelago (Solander, Forster).

#### MURENA POLYZONA. Richardson.

*Muraena polyzona*, Richardson, Ichth. of Voy. of Sulphur, p. 112, pl. 55, f. 11-14.

Nasal teeth biserial; the outer row composed of minute rounded teeth; the inner one of taller, rather bluntish, conical ones. Two conical teeth on the mesial line of the disk, somewhat taller than the marginal ones. Vomerine teeth anteriorly biserial, posteriorly covering a wider surface, with three or more irregular rows. Palatine teeth biserial, the rows coalescing behind: outer row consisting of very minute, low, flatish teeth; inner one of taller, slenderly cylindrical teeth, having moderately acute cusps: there are seven or eight in each row. Mandibular teeth biserial; the teeth of the outer row being by much the smallest, and gradually becoming less as they approach the corner of the mouth; those which form the inner row taller, with conical cusps, two or three near the fore end of the jaw being larger than the rest. The outer row of each limb contains eighteen or nineteen teeth, the inner one about twelve.

Gape small; margin of the posterior nostril tumid, the anterior nostril being, as usual, tubular; body much compressed, and the anus situated about the thirty-fifth part of the whole length before the middle of the fish.

The ground colour is black, with from twenty-six to twenty-nine yellow rings, which dilate a little on the ventral surface, but do not actually close there.

Length 9·35 inches. To anus 4·41 inches. To gill-opening 1·15.

HAB. Unknown.

#### MURENA CATENATA. Bloch.

*Gymnothorax catenatus*, Bl. t. 415. Schu. p. 528.

Nasal teeth biserial, conical, bluntish, about twelve in each row, set alternately, and inclosing a horse-shoe-shaped area, the posterior ones being the stoutest, but none of them high. From two to four stout conical teeth on the mesial line; and in one colourless specimen, these teeth, and

those of the inner marginal row, are so stout as nearly to fill the entire disk. Vomerine teeth biserial, small and rounded, of different sizes. Palatine teeth also biserial, twelve or thirteen in each row; the outer ones low, even, and bluntish, scarcely rising above the soft parts; the inner ones higher, conical or conico-subulate, and not so closely set: the teeth of both rows smaller than the nasal ones. Mandibular teeth likewise biserial, each limb having twenty-two in the outer row, which are closely set, and deeply imbedded in the soft parts; those of the inner row are a little higher, but equally blunt. The two rows are contiguous posteriorly, but separate a little towards the front of the jaw, where the inner teeth are stouter, and somewhat wider apart.

Posterior nostrils having slightly raised borders. Anus a little posterior to the middle of the fish. Dorsal commencing a short way before the gill-opening.

The fish is crossed by about twenty-six narrow yellow stripes, which pass over the dorsal and down the sides. Three of the stripes placed before the gill-opening form meshes with each other, and some of the posterior ones are interrupted, their upper and under halves alternating. They are most regular before the anus, where they slope forwards as they descend to the belly, and more irregular and wider on the tail. All of them are more or less spotted with the blackish ground colour.

Length 24·5 inches. To anus 13·5 inches. To gill-opening 3·5 inches.

HAB. Bermudas. Caribbean Sea. South America.

#### GYMNOMURENA ZEBRA. Shaw.

*Zebra eel*, Shaw Nat. Misc. 101.

*Gymnothorax zebra*, Bl. Schn. p. 528.

*La gymnomuraene cerdele*, Lac. r. p. 649, pl. 19, f. 4. An. 1803.

All the teeth low and flatly rounded, the larger ones having generally one or two grooves, with an intervening, acute, transverse ridge on their crowns. Nasal teeth biserial; the outer row composed of fourteen or sixteen very low teeth; the inner row of twelve or fourteen considerably larger and more prominent ones. These rows enclose a circular area, which is filled by six round teeth in two rows. The dental surface of the vomer has an oval shape, and there are eight rows of teeth in its middle, which narrow off to two before and behind. The anterior ones are in contact with the mesial nasal ones. The palatine teeth reach only about half-way to the corner of the mouth, the space beyond them being filled by a smooth thick fold of skin. On the mandible the teeth extend to the extreme corner of the mouth, being opposed posteriorly to the fold of skin just mentioned. They stand in four rows before the corner of the mouth, narrow to three near the middle of the limb, and on the anterior third of the jaw form only two distinct rows, though some very minute teeth may be detected at the base of the outer row. The inner row at the end of the jaw is composed of seven teeth on each limb, larger than the rest, and rendered still more prominent by a curve of the jaw. In this part of the jaw the inner rows of the

two limbs are in close contact, and cannot be separated. When the mouth is closed, these teeth are pressed against the equally prominent nasal ones, the posterior teeth of the two jaws being kept thereby some distance apart.

Eye small, considerably before the middle of the gape. Posterior nasal orifice having an elevated border, and placed a little before the eye. Anterior one shortly tubular. Dorsal fold of loose skin extending forward to the nostrils, too thick to allow the rays to be either seen or felt. Body compressed, the compression augmenting towards the tip of the tail, which is not acute though it tapers. Anus in the posterior third of the length.

Ground colour brown, with seventy-four white rings, some of which are not complete, and some unite before they reach the ventral surface, but the greater part are regular, and are all nearly of the same width.

This description is taken from Shaw's specimen, which was presented by the College of Surgeons to the British Museum. The backward position of its anus and other characters seem to point it out as a distinct generic form from *Murena*.

Length 30 inches. To anus 21 inches. To gill-opening 2½ inches.

HAB. Sumatra (Shaw). New Britain (Commerson).

#### ICHTHYOPHIS TIGRINUS. Lesson.

*Ichthyophis tigrinus*, Lesson, Voy. de la Coquille, pl. 12.

All the teeth slenderly subulate, rather tall and thinly set. Nasal ones uniserial, about twelve on the margin. Two rows of three each on the disk. Vomerine teeth six or seven, uniserial, with two abreast at the commencement of the series. Palatine teeth biserial; the outer series of twelve more reflex teeth; the inner series of six or seven taller ones. On the anterior third of the mandible the teeth are biserial, the inner row being composed on each limb of six or seven taller ones. Lateral mandibular teeth like the outer row of palatines.

Eye small. Anterior nostrils tubular. Posterior ones injured. Gill-opening nearer to the dorsal than to the ventral surface. Body nearly cylindrical, destitute of a loose dorsal fold. Tail a little compressed at the tip, which tapers, but is bluntish. No vestige of a fin exteriorly.

Length 29 inches. To anus 19½ inches. To gill-opening 1½ inches.

The great length of this fish in proportion to its diameter, its cylindrical form, and the want of fins, give it a character distinct from the *Murena*, and from the *Gymnomurena* of Lacepede, which are compressed.

HAB. "Oualan."

#### NETTASTOMA VITTATA. Richardson.

*Ichthyophis vittatus*, Richardson, Ichth. Voy. of Sulphur, p. 114, pl. 53, f. 7 D.

Since I described this species, in the work above quoted,

from a dried skin, said to have been brought from China, I have examined a specimen in spirits in the British Museum, which is labelled as having been brought from the West Indies, and purchased of a dealer. I have also had an opportunity of inspecting an example of the *Ichthyophis tigrinus* of Lesson, preserved in the same collection, and find that it differs totally in its dentition from the present species, so that in any dismemberment of the genus *Murena* they must be placed in widely different groups. I have now referred it to Rafinesque's genus *Nettastoma* (Duck-mouth), on account of the similarity of its dentition to that of *N. saga*, though I have not had an opportunity of seeing the latter species, which differs from *vittata* in having conspicuous fins, and may prove on examination to be a distinct form, in which case the appellation of *Chauno-murena vittata* may be given to this one, its very large mouth distinguishing it obviously from the *Murena*.

It has four large double-leaved gills enclosed in a sack on each side, and communicating with the pharynx by five round openings. There is no half-gill adherent to the side of the sack. The heart is situated rather behind the gill-openings, and at a considerable distance from the gills, and is tied to the pericardium by many tendinous threads. There is no tongue, but the under margin of the gullet forms a projecting soft fold, which falls back over the œsophagus like a valve. Pharyngeals presenting two linear dental surfaces above and below, widely separated from each other, and set with two rows of acute reflex teeth.

All the teeth on the jaws are slenderly subulate, and are disposed in even card-like plates. On the palatines they are about four rows wide, just behind the eyes, but thin off to three rows towards the extremities of these bones. On the lower jaw the dental surface is broadest near the symphysis, where there are three rows of teeth, but there are only two rows more posteriorly, which end in a point at the corner of the month. The nasal and vomerine teeth are not separated, or perhaps the latter do not exist, in which case the nasal dental plate is broadly oval, and composed anteriorly of about six rows in the width, but posteriorly contracts to two rows, which meet in a point a little behind the eye. The capacious roof of the mouth is lined with smooth skin. The corners of the mouth extend as far behind the occiput as that is distant from the tip of the snout. The small eye is situated over the fore part of the gape. The anterior nostrils are tubular, and the posterior ones have raised borders, and are placed above and just before the eyes.

The head is depressed, the nose acute, and the mandible longer than the snout: its limbs are capable of separating widely, and, owing to their length, of being greatly depressed, so as to expand the mouth enormously. The gill-openings are rather below mid-height, and far behind the skull. The body is nearly cylindrical, without any appearance of the loose dorsal fold which contains the fin-rays in the *Murena*; but behind the anus the tail is somewhat compressed, becoming thinner towards the tip. Rays actually exist near the end of the tail, but they can be seen only by dissection, and I could not ascertain how far forward they extend without injuring the specimen. The anus is in the posterior third of the fish. The skin is loosely attached to the muscular fascia.



Ground colour (in spirits) brown, the darkness of the tint being produced by short oblong specks. The body is crossed by about sixteen pale rings, occupying nearly as much space as the dark colour. The rings are not all complete.

Length 28 inches. To anus 18 inches. To gill-opening 43 inches.

This is the description of the British Museum specimen preserved in spirits. The dried one figured in the Zoology of the Sulphur has rather wider dental plates, owing probably to its greater age. It measured 48½ inches.

HAB. Gulf of Mexico? Sea of China?

#### OPHISURUS.

I have had no opportunity of examining the skeletons of the *Ophisuri*, nor of comparing the viscera of the different groups, and cannot therefore enumerate the principal characteristics of the genus, as I did with the *Muraenæ* in page 78, but I have given short descriptions of the external characters of all the species that have come under my notice.

M. Valenciennes characterises the genus by the elongated cylindrical body tapering towards the tail, clothed with naked skin, destitute of scales; the moderate gape; compressed knife-like (*dentes cultrati*) teeth, or rounded obtuse ones; the dorsal reaching from the occiput to the naked conical point of the tail; the anal like to it, but shorter; the pectoral fins more or less flabellate; the gill-rays thirty in number. Cuvier divides the species into two groups; one having pectorals of the ordinary size, and sharp and trenchant teeth; the other having pectorals exceedingly small, so much so as to have been overlooked by some observers altogether, and obtuse teeth. The discovery of additional species since the publication of the *Regne Animal* has rendered this subdivision less exact, for the *Oph. cancrivorus* presents the combination of pretty large pectorals with obtuse teeth; and we shall also describe species that have almost rudimentary pectorals with acute teeth. In fact, the gradation from acute or acicular teeth to small rounded grinding ones is almost imperceptible, and there is a similar passage from the large to the minute pectorals. I have seen no species with teeth so trenchant as the stileto-pointed teeth of some of the *Muraenæ*,—certainly none meriting the designation of *dentes cultrati*. The following artificial arrangement, founded on the dentition and size of the pectorals, may be useful to the student in the discrimination of species.

#### A. Teeth short, conic, more or less blunt.

##### a. Pectorals comparatively large.

Teeth triserial or pluriserial on the several bones.

*O. cancrivorus*; *sinensis*; *semicinctus*; *boro*.

##### b. Pectorals small or rudimentary.

1. Vomerine teeth tri- or pluriserial; palatine and mandibular teeth biserial.

*O. breviceps*; *pardalis*.

2. Vomerine teeth biserial; palatine teeth uniserial; mandibular teeth uniserial or sub-biserial.

*O. fuscatus*; *colubrinus*.

#### B. Teeth acute, conico-subulate, subulate or acicular.

##### a. Pectorals small and delicate, moderate sized or rather large.

1. Vomerine teeth triserial; palatine and mandibular teeth biserial.

*O. pallens*.

2. Vomerine teeth biserial; palatine and mandibular teeth biserial.

*O. hijala*; *maculosus*; *intertinctus*.

3. Vomerine teeth sub-biserial or uniserial; palatine and mandibular teeth uniserial.

*O. spadiceus*; *versicolor*.

4. Vomerine teeth uniserial; palatine and mandibular teeth biserial

*O. sigillatus*; *ocellatus*; *parilis*; *dicellurus*; *rosellatus*.

5. Vomerine teeth uniserial; palatine teeth uniserial; mandibular teeth biserial.

*O. compar*.

6. Vomerine teeth uniserial; palatine teeth biserial; mandibular teeth uniserial.

*O. regius* (vel *ophis* ?); *serpens*.

##### b. Pectorals minute, no vertical fins.

Teeth on the several bones uniserial.

*O. vimineus*.

*Obs.*—*Ophisurus cancrivorus*, *breviceps*, *compar* and *parilis*, have a close external resemblance, and may be confounded if attention be not paid to the dentition, and some other comparative characters included in the descriptions. In like manner, there is a general similarity in the markings of *semicinctus*, *pardalis*, *maculosus*, *intertinctus* and *sigillatus*. *O. haraucha*, *pallens*, *spadiceus*, *versicolor* and *hijala*, form a small group, of a peculiar aspect, which belongs to India and China. *O. fasciatus* and *colubrinus* are remarkable for the length of their long, compressed banded bodies; *versicolor*, which is also banded, is more cylindrical; and *serpens* and *regius*, agreeing in the nacre lustre of their bodies, differ from one another and from all the rest in the form of their laterally expandible jaws. *O. vimineus* differs from the other species in the absence of vertical fins, just as the *Ichthyophis* of Lesson does from the *Muraenæ*.

OPHISURUS CANCRIVORUS. Richardson.

Plate L., figs. 6—9.

Nasal disk circular, armed with about fifteen crowded, round, rather flat-crowned teeth, of different sizes, separated from the dental surface of the vomer by a membranous line. The vomerine teeth stand about five abreast throughout, but the anterior part of the dental band, being composed of larger teeth, is wider. The swelling folds of

the soft palate partly overlies the posterior teeth of the vomer, which is the cause of the artist having represented, in fig. 8, the dental surface as tapering more towards the gullet than it actually does. Palatine teeth smaller than the nasal ones, not quite so flat on the crowns, and disposed so as to form an elliptical dental plate, which has also been drawn in figure 8 as tapering too much, owing to the pointing of the lips. There are six or seven teeth abreast in the widest part of the plate, and two or three posteriorly. The dental plates on the limbs of the lower jaw contain about five teeth in the middle, and taper off gradually towards the corner of the mouth. They are separated from one another at the symphysis by a smooth line. The upper jaw projects so much beyond the mandible, that the whole nasal disk is anterior to the tip of the latter; and when the mouth is closed, the convex dental surface of the fore end of the mandible applies to the anterior vomerine teeth, which correspond with them in size, and are larger than the other teeth.

The head is conical, the snout small and acute, with a thick short tubular nostril on each side of it, but a little posterior to the extreme tip, and having an inclination downwards. The posterior nostril is under the eye, rather on the inner border of the lip, and is covered by a valve which gives a downward aspect to the opening. A small acute papilla overlies a minute notch on the edge of the lip, between the nasal openings of each side, and behind the posterior nostril there exists a more minute papilla, all of which contribute to give a character to the orifice of the mouth different from that of *Anguilla* or *Muraena*. The eye is rather small. There are four conspicuous pores on each limb of the mandible, several on the under lip, and three on each side of the snout above and before the eye. The nape and throat, being elastic, bulge out, and are the thickest parts of the fish; they are marked on each side by about twenty-four fine longitudinal furrows, which run back to the gill-openings. The elasticity of these parts is maintained by thirty-three gill-rays, which spring from each branch of the *os hyoides*: they are as fine as horse hairs, and are very curiously arranged in two layers. The rays of the left branch make an abrupt curve across the throat, and then return to circle round the left operculum to the nape. On the right side, the twenty uppermost or posterior rays run ventrad of the left rays, curving more than half-way across the throat, and returning over the operculum to the right side of the nape; while the thirteen anterior ones sweep at once to the left side, in contact with the left gill-sac, and consequently above or dorsad of the rays which spring from the left branch; they then curve backwards across the throat to the right side, where they protrude a little from beneath the edge of the other rays.

Gill-openings wider than those of *Muraena*, and lower down, being similar in appearance to those of *Anguilla*. Branchiae four, with five openings at their bases into the gullet. Pharyngeal bones armed with acute teeth. Heart posterior to the branchiae, and placed between the hinder lips of the gill-openings. The humeral arch is composed of two slender bones on each side, which do not meet their fellows on the ventral line. Pectoral fin oval, of moderate size, sustained by sixteen branching rays.

Body nearly cylindrical, the back carrying its roundness far past the anus, and the tail, which is more compressed towards the tip, retaining its lateral convexity, its extreme tip being conical. The dorsal commences just behind the base of the pectoral, and carries its width well down the tail, as does also the anal. A slight increase in the breadth of the fins takes place just before they suddenly slope off, leaving the extreme point of the tail destitute of rays, but edged above and below with a scarcely perceptible cutaneous seam. The anus is placed at about one-twelfth of the whole length of the fish before the middle. The skin is smooth, without scales, and there is no perceptible lateral line. The specimen, after long immersion in spirits, has a dusky brown colour, darker on the back, paler on the belly, and without spots.

The coecal stomach tapers to a point, and the pylorus opens obliquely through its coasts, at its upper end, so as to form a valvular obstruction to the return of matter from the gut. A spiral valve exists in the lower part of the gut, like that which occurs in the *Muraena*. The long and slender air-bladder is thickest at its lower end near the anus, and tapers upwards to a hair-like point. It is  $3\frac{1}{2}$  inches long, and sends an air-duct from its middle to the oesophagus.

Length of the fish 24 inches. To anus 10.5 inches. To gill-opening 2.6 inches.

HAB. Port Essington.

Cuvier notices only two groups of *Ophisuri* in his *Regne Animal*, one having acute cutting teeth and pectorals of the ordinary size, and the other blunt teeth and extremely small pectorals; but he mentions none which have pectorals as large as in *Anguilla* combined with small flat-crowned teeth, like to those of *cancrivorus*. Two other *Ophisuri* of the same group exist in the British Museum, one of which, procured from Singapore, resembles *cancrivorus* closely, except that the snout is comparatively shorter, and the dorsal begins a very little farther forward, viz., opposite to the basal third of the pectoral, and also that the pectoral itself is a little larger. The length of the fish is 14 inches. The anus is only 1.4 inches from the tip of the snout, or rather farther forward than in *cancrivorus*. To the gill-opening 3.1 inches. The colour is a purer chestnut brown, paler below the middle, and resolvable there, when viewed through a lens, into minute specks. The fins are dark, and the lateral line is marked by a series of minute, distant pores. The differences I have pointed out may perhaps be only individual variations, and without access to a series of specimens it would be unsafe to name this fish as a species distinct from *cancrivorus*. The other specimen was procured at the Philippine Islands by Mr. Cuming, and is larger, but without any marked difference in form.

OPHISURUS SINENSIS. Richardson.

In the Cambridge Philosophical Institution there is an *Ophisurus*, brought from China by the Rev. George Vachell, which has so great an external resemblance to

*caucrivorus*, that it might readily be confounded with it. The following differences, however, appear to exist, if the notes I made at Cambridge be correct, for I have not compared the specimens. The dorsal and anal lower more posteriorly before they swell out gradually, and contract again as gradually for an inch anterior to their termination, close to the apex of the tail. The bands of teeth on the several bones are narrower.

Length 19½ inches. To anus 7¾ inches. To gill-opening 2.05 inches.

HAB. Canton.

Without further examination, I cannot confidently propose this as a species distinct from *caucrivorus* or the varieties noticed above as inhabiting the seas of the Moluccas and Straits of Singapore.

Another species resembling *caucrivorus* in its dentition, pectorals and general form, is the

#### OPHISURUS SEMICINCTUS. Richardson.

The nasal teeth, about thirty-three in number, are disposed in a convex oblong-oval disk, which is not separated by a distinct line from the vomerine teeth. The latter run far back, and are placed two deep anteriorly, four in the middle parts, and two again posteriorly. The palatine teeth form two or three irregular rows, and the teeth of the mandible are mostly ranged in three rows, which increase to four near the symphysis. The dorsal commences about an inch before the gill-opening, and, together with the anal, carries most of its breadth to near the tip of the tail, where both fins slope suddenly away. The extreme tip of the tail is roundish, conical and rigid, but not pungent. Pectoral fin moderately large, sustained by twelve rays, and tipped with brown.

Colours much faded. A black spot, flanked by two others, marks the hind head, and the top and sides of the jaws are covered with brown dots of the size of swan-shot. The body is banded by eighteen large deep purplish-brown spots or bars, that fade away a little below the lateral line, except the three last, which encircle the tail. The dorsal and anal are edged with blackish-brown.

Length 28.75 inches. To anus 12.25 inches. To gill-opening 3.12 inches.

The origin of this specimen is unknown. It was sent from the College of Surgeons to the British Museum, and is labelled 813, and 2, 45, 29, 15. Some verdigris in the spirit in which the specimen has been kept has tinged the teeth a rich green. Another specimen, which is dried, was brought by one of the Earl of Derby's collectors from Western Africa, and presented by his lordship to the British Museum. Its teeth are white, and its length 28 inches.

This species differs from *pardalis* in having considerably larger pectorals; and from *maculosus*, *intertinctus* and *sigillatus* in having blunt teeth. In its markings it bears a more or less close resemblance to all these.

HAB. Western Africa, north of the Equator.

*Ophisurus boro*, Buchanan-Hamilton, Fish of Ganges, p. 20, 363. Gray, Ill. Ind. Zool. i. Pl. 93, f. 1. Hardw. Icon. ined. 301 in Museo Brit. serv.

This *Ophisurus* agrees with *caucrivorus* in having a conspicuous pectoral and blunt teeth, but it is a more slender species, with a smaller head. The specimen described below is certainly the one figured in the 'Illustrations of Indian Zoology,' and agrees with Hardwicke's drawing above quoted, which is probably a copy of one of Hamilton-Buchanan's, being marked M. H. B. 335, but its pectoral, though small, cannot be said to be "minute," as stated in the specific character given by the latter author. It is probable, however, that he had not observed the rudimentary pectorals of the *Ophisuri* of the next group, and by the word 'minute' meant merely to denote the comparatively small size of the pectorals, as contrasted with those of some others of the *Anguillidae*.

Its dentition is similar to that of *caucrivorus*, but the bands are narrower, and the teeth smaller and more uniform in size, except the central nasal ones, which are a little larger. The nasal cluster contains in one specimen only three teeth, and there are generally about three irregular rows in the vomer, palatines and mandible. The dorsal commences nearly an inch behind the gill-opening, and, together with the anal, gradually narrows, until it can no longer be traced very near the tip of the tail, which is edged to the apex by a cutaneous fold above and below.

This specimen, which has been long immersed in spirits, is pale brown. The belly is lighter, and the fins whitish. The drawing is coloured dark green, with minute specks.

Length 24.6 inches. To anus 9.9 inches. To gill-opening 2.1 inches.

HAB. Indian Ocean. Estuaries of rivers and salt-water lakes.

#### OPHISURUS BREVICEPS. Richardson.

An *Ophisurus* in the British Museum, remarkable for its short blunt head, but having the lower jaw, as usual, shorter than the upper one; may be considered as intermediate between the preceding species and the group mentioned below,—agreeing with the former in dentition and general aspect, and with the latter in its very small pectoral, attached like a valve to the lip of the gill-opening. This pectoral contains twelve rays. The dorsal commences near the occiput before the gill-opening, and tapers gradually away, so as to become nearly imperceptible before it actually terminates, about five lines from the tip of the tail, which is more compressed than it usually is in this genus. The anal vanishes in a similar way opposite to the end of the dorsal. Head short and thick, with a comparatively wide snout. Eye and gape both small.

Group of bluntish teeth on the nasal bone circular, separated from the triserial vomerine ones, which run far back and end in a single row. The palatine teeth are

small, biserial and blunt, and form a short row in accordance with the small gape.

Length 38 inches. To anus 18.75 inches. To gill-opening 3 inches.

This specimen came from the College of Surgeons, where it was numbered 812.

HAB. Unknown.

#### OPHISURUS PARDALIS. Valenciennes.

*Ophisurus pardalis*, Valenc. Webb. et Berth. Canaries, p. 90, Pl. 16, fig. 2.

Though I have not seen a specimen of this fish, yet, to render the account of the species more complete, I have transferred the subjoined description of it from M. Valenciennes' able account published in Webb and Bertholet's book on the Canaries.

It belongs to the group of *Ophisuri*, which have blunt teeth and rudimentary pectorals. Its cylindrical body becomes gradually conical at the end. The mean height of the trunk is contained thirty-seven times and a half in the whole length; and the distance from the end of the snout to the base of the pectoral is contained twelve times in the same entire length, but only five times up to the anus. The head and cheeks are moderately swollen, owing to the size of the crotaphite muscles. The mouth is cleft beyond the eye, whose diameter is contained twice between its anterior border and the tip of the snout, four times in the length of the orifice of the mouth, and twice and a half between the eyes. The region of the gills bulges considerably; the opening is small. The obtuse teeth are ranked in two series along the intermaxillary (palate-bone of Owen), which is articulated, as in the *Anguilliformes*, to the posterior border of the chevron of the vomer (nasal-bone, Owen), which projects to the end of the snout. This whole extremity of the vomer (nasal, Owen) and its body (vomer, Owen), are covered with many rows of small obtuse teeth. There is also a band on the limb of the mandible. The two openings of the nostrils are tubular, and pierce the edge of the jaw: the anterior one is near the extremity of the snout, and its tube hangs down on one side like a small barbel; the posterior one opens under the middle of the eye, and its orifice is covered by a tubular papilla placed on its outer border. When the skin is removed, one perceives a large nasal sac, which is covered by the great nasal-bone (turbinate bone, Owen), which is vaulted to make room for the nostril; beneath the sub-orbital, in form of a thin plate, edges the intermaxillary (palatine, Owen). On raising the soft parts of the palate, we may perceive a very thin palatine, succeeded by very small alar bones, wholly rudimentary, which nevertheless form the arch connected with the limb of the mandible. The dorsal begins at the nape, and appears to become higher and lower several times in the course of its length. The anal is more equal. The pectorals are very small, but yet their rays are perceptible. The only vestige of a lateral line is a series of distant pores, not easily traced.

The ground colour is whitish, dotted with round brown

spots, of various sizes, fading into the ground tint, and forming two principal rows on the flanks. The belly is more white, the spots smaller and fainter.

HAB. Rocky basins at Lancerotta, among sea-weeds.

#### OPHISURUS FASCIATUS. Thunberg. (*Muraena*).

*Muraena fasciata*, Thunberg, Spec. Ichth. t. 2, f. 1. An. 1789—94.

*Gymnothorax fasciatus*, Bl. Schn. 529.

*Ophichthus alternans*, Quoy et Gaim. Voy. du Freyc. Pl. 45, f. 2.

Teeth small, short-conical and bluntnish. The oval nasal disk is covered by eight or nine of them, which are contiguous to the commencement of the biserial vomerine ones. The palatine teeth are uniserial, but they stand alternately a little to the right and left. Mandibular teeth also uniserial. Pectoral minute, like a roll of skin, with no perceptible rays under a common lens. Fins low, the anal ending 3 inches from the tip of the tail, but a furrow, pierced by a series of fine pores, occupies the interval. Dorsal disappearing about  $\frac{3}{4}$  of an inch from the tip of the tail. It is sufficiently distinct at the occiput, and, like the anal, it lowers gradually before it ceases to be traceable. The skin round the mouth is papular. The head is small, the snout blunt, and the mandible shorter. The gape small. The body compressed.

The colour is bluish-gray, varied by thirty-three pale chestnut-brown rings, which cross the fins, and in the intervals there is generally one round brown spot, but occasionally two, and then one of them is placed over the other. Lateral line distinct.

Length 26.5 inches. To gill-opening 1.3 inch. To anus 12 inches.

Three specimens exist in the British Museum, and there is one in the Leyden Museum, from India, labelled *Ophichthus colubrinus*.

HAB. Malay Archipelago. Indian Ocean.

#### OPHISURUS COLUBRINUS. Boddaert.

*Muraena colubrina*, Boddaert, apud Pall. Beytr. xi. p. 56, t. 2, f. 3. An. 1781—90.

*Muraena annulata*, Thunberg, Spec. Ichth. viii. t. 1, f. 1. An. 1789—94.

*Gymnothorax unaulatus*, Bl. Schn. p. 527.

Lacepede (v. p. 642, Pl. 19, f. 1) describes and figures a *Muraenophis colubrina*, which he refers erroneously to the *Muraena colubrina* of Boddaert, Thunberg and Gmelin. The latter fish has about sixty rings of colour on the body, which are alternately black and white; whereas Lacepede's figure, besides representing the fin as surrounding the point of the tail, shows only about half that number of rings. Having found a *Muraena* in the British Museum, which corresponds with Lacepede's figure above quoted, I described it above at page 88, under the specific name of *colubrinus*, quoting Commerson as the discoverer, under the



authority of Lacepede, but rejecting the synonyms of Boddaert and Thunberg, which relate to a true *Ophisurus*, of which a specimen exists in the Museum at Haaslar, and the description follows.

Teeth short-conical, bluntnish, small. Nasal teeth about six, ranged in two rows, and alternating so that there is an odd one in front. Vomerine teeth uniserial in front, biserial posteriorly. There are about eight in each row posteriorly, and four single ones anteriorly, between which and the vomerine disk there is a smooth space. The palatine teeth commence posterior to the beginning of the vomerine teeth, and consequently at some distance from the nasal ones, but reach rather past the angle of the mouth. There are fourteen or fifteen on each side, and two or three anterior pairs, being set alternately, make the series double there, but the nine posterior ones stand in a single row. The mandibular teeth are placed in a single row on the lateral limbs of the bone, but at the symphysis the teeth are a little larger, and two interior ones on each side give a clustered appearance to the dentition at the end of the jaw.

This *Ophisurus* is a long slender species, with a small head, closely resembling *Ophisurus fasciatus* in form. The head is narrow, but the upper jaw is obtuse, with a tubular nostril sticking out on each side. The other nostril and upper lip have likewise the generic character. Lower jaw considerably shorter than the upper one. Body compressed, becoming gradually more so towards the tail. Fins low. Pectoral very small and delicate, but the rays are nevertheless perceptible by the aid of a common lens. Dorsal fold commencing over the angle of the mouth, and ending half an inch from the point of the tail, having previously gradually lowered, so as to be visible only by aid of a lens. Anal ending about three quarters of an inch from the point of the tail, which is compressed, and tapers gradually. Lateral line evident to the naked eye, and composed of an almost continuous wavy tube, with a pore at each flexure. Body marked by a series of bluish-gray, almost white, rings, alternating with as many blackish-brown ones, occupying nearly equal spaces. In the specimen here described there are twenty-eight rings of each colour, not reckoning the white speck covering the tip of the nose. The first pale ring encircles the hind head, and just touches the eye and the angle of the mouth; the last one includes the end of the tail. The first black bar reaches from the anterior nostril to the eye, and takes in most of the lower jaw.

Length 18½ inches. To anus 8½ inches. To gill-opening 1 inch. Height of body 0·2 inch.

A specimen in the British Museum, measuring 26 inches in total length, and 12½ inches from tip of snout to anus, has thirty rings of each colour; and the anal can scarcely be traced beyond two inches and a half from the tip of the tail, though its existence farther on a little way is indicated by a furrow. A specimen in the Museum at Leyden resembles the one described above in having twenty-eight black rings: this individual was obtained in India. Another, taken at the Moluccas, and preserved in the same Museum, has thirty-two dark or blackish bands, which do not meet on the belly. The ground colour is whitish.

These fish being kept in jars closed by bladder and varnish, no examination of their teeth, &c., could be instituted. A third specimen at Leyden has been named as the *alternans* of Quoy and Gaimard, but it wants the intermediate spots.

HAB. Malay Archipelago. Moluccas. Polynesia. India.

#### OPHISURUS PALLENS. Richardson.

Nasal teeth five in number, the odd one in front. Vomerine teeth triserial. Palatine teeth biserial, meeting the vomerine ones immediately behind the nasal disk. Mandibular teeth biserial in front, uniserial posteriorly. All the teeth are short and conico-subulate or conic and acute; the nasal and front mandibular ones are stouter and more prominent than the others. Dorsal and anal ending opposite to each other, within two lines of the tip of the tail. The general appearance of this *Ophisurus* is like that of *hijala*. Its lateral line is similar, and the pectoral considerably smaller. The vertical fins are low, and taper gradually away. The dorsal commences as far behind the gill-opening as that is distant from the tip of the snout. The colour is a pale honey-yellow or faint wood-brown, lighter on the belly, and without spots. The specimen was brought from China, and presented to the British Museum by John Reeves, Esq. It has been immersed in spirits for some years.

Length 11·9 inches. To anus 4·4 inches. To gill-opening 0·85 inch. Length of pectoral 0·40 inch. Gape 0·35 inch.

HAB. China.

*Obs.*—I described this specimen in the 'Report on the Ichthyology of China,' p. 313, as referrible, though with doubt, to the *Ophisurus harancha* of Buchanan-Hamilton, but on further consideration I think it safer to give a proper name to the Chinese specimen, which, had it been originally as dark as the *harancha* is represented to be in number 302 of Hardwicke's Indian drawings, could scarcely have become so pale by simple maceration in spirits as it is now. I suspect that an error has crept into my notes with regard to the specimen of *harancha* from India, which I have mentioned in my Report on Chinese Fish as existing in the British Museum, since I could not find it on my recent examination of the species in that collection, and I cannot therefore speak of the characters of *harancha* from the actual inspection of a specimen.

In the Museum of the Cambridge Philosophical Institution there is an *Ophisurus*, procured at Canton by the Rev. George Vachell, which, on inspecting it there, but without a comparison with the specimens in the British Museum, seemed to me to possess the characters ascribed by Buchanan-Hamilton to *harancha*. I find that I have noted it as a slender species with very low fins, having a pectoral on an elliptical form, supported by thirteen rays, with its tip just passing the small depression or pit which marks the origin of the dorsal. The termination of the dorsal and anal could not be distinctly made out, but the tip of

the tail shows an edge of skin above and below without rays. The mouth is cleft past the eye. The teeth are stoutly subulate. The nasal ones taller than the rest. Palatine ones biserial, the rows short. Mandibular ones uniserial posteriorly, biserial in front, the rows farther apart than the palatine ones. Vomerine teeth biserial in front, uniserial posteriorly. It thus differs from *pallens* in the vomerine teeth. Its colour is brown on the back, pale beneath. Length 14½ inches. To anus 5·3 inches. To dorsal 1·9 inch. To gill-opening 5·55 inches. Length of pectoral ½ inch. HAB. Chinese Seas.

OPHISURUS HIJALA. Buchanan-Hamilton.

*Ophisurus hijala*, Buch.-Hamilton, Ganges, p. 20 and 263, Pl. 5, f. 5. Hardw. Icon. ined. Brit. Mus. 300.

This is a vermiform species, with a rather small, but not a rudimentary, pectoral. The specimen described below was bequeathed to the British Museum by General Hardwicke.

The teeth are short, conico-subulate and acute, stoutest on the nasal bone and in front of the mandible. There are five on the nasal disk, viz., two on each side and an odd one in front. The vomerine teeth are biserial, and commence in contact with the nasal disk. The palatine teeth are also biserial, and the mandibular ones biserial in front but uniserial laterally.

The head is small; the body long, roundish and slender, the conical tip of the tail being compressed, but yet convex on the sides. The dorsal commences behind the tip of the pectoral, and, like the anal, gradually lowers till very near the tip of the tail, where they terminate. In Buchanan-Hamilton's figure, the dorsal approaches a little nearer to the tip than the anal, which is usual in the genus, but this part of the form could not be clearly made out in the specimen, owing to the lowness of the fins and their contraction in the spirit. The lateral line is marked by a groove, which was probably a tube in the recent fish, with pores at distant intervals descending from it.

Length 14·8 inches. To anus 5·7 inches. To gill-opening 1·15 inch.

Buchanan-Hamilton describes this *Ophisurus* as being of a whitish hue beneath and thickly covered with green dots above, the dots descending below the lateral line before the vent, but terminating at it posteriorly. There is also a series of pale round contiguous spots on the lateral line before the vent. He states the rays as "P. 8; D. from 230 to 240; A. 170." General Hardwicke's drawing is coloured very pale green on the back, with minute specks, whitish on the belly, and aurora-red on the vertical fins. In the *Regne Animal* (ii. p. 351, note) the *hijala* of Buchanan-Hamilton is quoted as a synonym of the *Oph. ophis*, Bl. 154, but, evidently by a typographical error, the line separating distinct species having been omitted.

HAB. India. General Hardwicke's specimen was procured from a salt-water lake.

OPHISURUS MACULOSUS. Cuvier?

*Ophisurus maculosus*, Cuv. Regne Anim. ii. p. 351, in notis.  
*Ophisure ophis*, Lacep. ii. Pl. 6, fig. 2.

The fish described below agrees with Lacepede's figure above quoted, which does not represent the *Murena ophis* of Bloch, but his description (ii. p. 196), which notices "dents recourbées," most probably refers to Bloch's fish. Not having seen an authenticated specimen of Cuvier's *maculosus*, the only reason I have for supposing this to be the same is that author's reference to Lacepede's figure. It has much resemblance to the *Ophisurus pardalis* of Valenciennes, and without a comparison of specimens, which I have not the means of instituting, I cannot point out the differences clearly. They are, however, inhabitants of different oceans.

The teeth are all small, conic and acute; eight stand irregularly on the oval disk of the nasal bone. The vomerine, palatine and mandibular teeth are biserial. Valenciennes mentions "de dents obtuses sur plusieurs rangs" as existing in his similarly-marked *pardalis* on the nasal bone and vomer, or, as he names these bones, the chevron and body of the vomer. The fish is slender, becoming compressed towards the tip of the tail. The pectoral is of a semicircular form, small and delicate, but easily visible to the naked eye, and is supported by fifteen rays. Only twelve rays are described as belonging to the pectoral of *pardalis*. The distance from the tip of the snout to the gill-opening is contained eight times in the distance between the snout and anus, and eighteen times in the total length of the fish, which places the gill-opening farther forward than in *pardalis*. The dorsal begins at the occiput, and, in common with the anal, gradually lowers towards the end of the tail. They terminate opposite to each other, very near the extreme tip of the tail. The body is marked with round brown spots, disposed in three rows in a quincuncial manner. The spots of *pardalis* are more oblong and less regular.

Length 22 inches. To anus 9·25 inches. To gill-opening 1·25 inch.

Two specimens exist in the British Museum.

HAB. Madagascar.

OPHISURUS INTERTINCTUS. Richardson.

The teeth generally are subulate and acute, more or less slender, and mostly inclined backwards. The nasal disk is set round the edge with five small ones, the odd one being at the point of the rather acute snout, and there are three larger teeth on the mesial line, the foremost of which is stoutly subulate, but not so tall as the second one. The biserial vomerine teeth commence close to the nasal disk, and run backwards for two-thirds of the way to the angle of the mouth. The palatine teeth are biserial in the middle, where the inner row is composed of thirteen teeth, not so tall as the outer ones. There are four tall ones anteriorly in a single row, and four small ones at the corner of

the mouth, following the double rows. The mandibular teeth are biserial on the sides of the bone, the outer row being taller and more widely set, the inner row being close, even and more numerous. In front there are six longer teeth in a single row on each limb, the posterior of these being the tallest, the others gradually lessening towards the symphysis.

This *Ophisurus* resembles *ocellatus* in the snout not being truncated at the anterior tubular nostrils, but projecting in a conical form beyond these organs, and in the lower jaw not being conspicuously shorter. The gape is also pretty large, in accordance with its well-developed prehensile teeth, and the pectoral visible enough, though not large. The dorsal commences some little way behind the tip of the moderately large pectoral, or three quarters of an inch behind the gill-opening, and ends opposite to the end of the anal, about a quarter of an inch from the apex of the tail. Both fins, having previously become very low, dilate a little gradually before they terminate.

The head is brownish above, with small dark spots and specks, and there are minute dots on the lower jaw. There are about sixteen large oval or round blackish-brown spots on the sides, mostly above the lateral line; one or two only come below the line, and a few on the dorsal alternate with the others.

Length 12·7 inches. To anus 5·9 inches. To gill-opening 1·4 inches.

HAB. West Indies. The specimen described is in the British Museum.

Obs.—An *Ophisurus* labelled *maculatus* in the Leyden Museum, and noted as having come from Surinam, is, I suspect, this species; but being enclosed in a permanently covered jar, I could examine it only through the glass. I have had no opportunity of knowing what the *Ophisurus guttatus* of Cuvier is like, and consequently run the hazard of its being one of the species I have described. A specimen in the Leyden Museum, labelled "*Ophisurus guttatus*, Valenciennes," is marked with large white spots, and has pale fins, and may probably be a variety of *Le Sueur's ocellatus*. Another individual, from Curacoa, in the same Museum, labelled "*Oph. guttatus*, Cuvier," has black spots with white centres.

#### OPHISURUS SPADICEUS. Richardson.

*Ophisurus spadiceus*, Richardson, Fishes of China, Report to Brit. Assoc. for 1845, p. 313.

Teeth short, even, conico-subulate, acute. Nasal disk armed by five, disposed in a row on each side, with the odd one in front. Vomerine teeth alternate or sub-biserial anteriorly, but ranged more exactly in one line posteriorly. Palatine teeth uniserial and close set, extending from the corner of the mouth to the commencement of the vomerine series, and with those of the opposite bone, giving the appearance of a cluster at the point of contact of the three rows. There are twenty-two in each palatine bone. Mandibular teeth uniserial, without doubling at the symphysis.

Body vermiform. Head small. Snout narrow, but truncated at the tip, with short tubular nostrils on its sides; the posterior nostrils minute, with the usual lobulets on the edge of the lip. Lower jaw considerably shorter than the upper one, rounded at the end. Throat plaited and swelling. Pectorals lanceolate, acute, moderately large, supported by eleven rays. Dorsal and anal fins low, decreasing on the tail, but becoming gradually a little higher, and again lowering just before terminating very near the tip of the tail. The dorsal commences behind the tip of the pectoral. The rays of the fins can be readily seen. Lateral line a conspicuous fold of skin.

The colour of the specimen, after some years of maceration in spirits, is darkish wood-brown above the lateral line, and whitish beneath, without any defined spotting.

Length 13½ inches. To anus 4·8 inches. Length of pectoral 0·55 inch. Height of body 0·4 inch. In the Report to the British Association above quoted, the distance between the tip of the snout and the anus has been erroneously given as 5·8 inches.

HAB. Canton. The specimen was presented to the British Museum by John Reeves, Esq.

#### OPHISURUS VERSICOLOR. Richardson.

This is a banded species, like *colubrinus* and *fusciatus*, though its acute subulate teeth place it in a different section. The nasal disk is armed with nine slender reflex teeth, viz., four in each row and an odd one in front. The vomerine teeth are seventeen in number, a few of the anterior ones being inclined alternately to the right and left, and the remainder strictly uniserial. Palatine teeth uniserial, anteriorly biserial in the middle after the sixth, and then uniserial again towards the corner of the mouth, where they are of equal height, close, reflex, and, like the others, acutely subulate. Mandibular teeth uniserial, about nineteen on each limb, all reflex and subulate, with a broadish toothless interval at the symphysis.

The body of this species is less slender and more rounded than that of *fusciatus* or *colubrinus*, the pectoral is more conspicuous, and the dorsal and anal increase gradually in height to a small extent before they begin to slope away and disappear about a quarter of an inch from the end of the tail. The dorsal is low, and commences immediately behind the gill-opening. The body is varied by twenty-seven purplish-brown rings, considerably broader than the intervals between them; most of the rings are further divided more or less completely by narrower white lines or imperfect circles. Tips of the snout and tail white.

Length 20·8 inches. To anus 10·1 inches.

HAB. Moluccas. Specimen in the British Museum purchased of Franks, who had it from the Leyden Museum.

#### OPHISURUS SUGILLATUS. Richardson.

The *Ophisurus semicinctus* and *pardalis*, which are spotted much like *sugillatus*, differ in their much smaller pectorals and conical-obtuse teeth, with smaller mouths:

*maculosus* and *intertextus*, which are spotted in a similar way, have also smaller pectorals.

Gape of the mouth moderately large, exceeding one third of the distance between the point of the snout and the gill-opening, and equal to the greatest height of the body. Eye midway between the tubular anterior nostrils and angle of the mouth, small. Snout narrow and projecting some way beyond the nostrils, but not acute. Second nasal opening on the edge of the lip, under the eye, with the usual lobulets. Lower jaw rounded at the end, a very little shorter than the upper one. The integuments of the head, above and below, including the jaws, the neck, the throat, and the belly half-way to the anus, are wrinkled by short furrows, which for the most part run longitudinally and parallel to each other. The height of the body equals the twenty-eighth part of the whole length. The pectoral is moderately large, equalling in length the distance from the posterior part of the orbit to the point of the snout. The dorsal commences a short way farther back than the tip of the pectoral, and terminates within half an inch of the acute point of the tail, opposite to the end of the anal, both fins having previously gradually lowered. The lateral line, consisting of a continuous series of short tubes with porous openings, is conspicuous enough. The jaws and nape are covered with large black blotches, separated by smaller pale, probably yellowish, intervals. The nuchal black patch descends like a ring a little way behind the mouth, and runs forward on the under surface between the limbs of the mandible, and backwards nearly to the gill-opening. There is a yellowish patch at the corner of the mouth, and another on the side of the throat. The top of the head and temples, and the back and sides of the neck, have a bluish-gray colour, with many round black dots the size of swan-shot. The back and sides are marked by many large brownish-black roundish or oval spots, from the size of a chestnut down to that of a pea, irregularly disposed, but with three principal rows, the middle one being on the lateral line and numbering about twenty-seven spots: these mostly alternate with the series on the top of the back. The spots on the belly are small and distant. The colours are described from the dried specimen, and have faded on the fins, which, however, retain traces of spots.

Teeth rather stoutly subulate, longish and considerably recurved. The small and narrow nasal disk is armed by five, one in front, one on each side, and two in contact with the commencement of the vomerine series, which is strictly single, and contains ten or eleven larger than the nasal ones, and more recurved. Palatine teeth biserial, the two rows differing little in the size of the teeth, and the outer one being less crowded. There are three small teeth in a single series before the beginning of the two rows, and perhaps some also behind; but the mode in which the specimen has been prepared prevents me from seeing distinctly the dentition at the corner of the mouth. The mandibular teeth are also biserial.

Length 56 inches. To anus 26 inches. To gill-opening 5·6 inches. Length of gape 2 inches. Height of body about 2 inches.

The origin of the specimen deposited in the Museum at

Haslar is unknown, but it is supposed to have come from the West Indies.

#### OPHISURUS OCELLATUS. Le Sueur.

*Muraenopsis ocellata*, Le Sueur, Journ. Acad. Nat. Sc. of Philadelpia, v. Pl. 4, f. 3.

All the teeth slenderly subulate or acicular, except the five marginal nasal teeth, which are subulate and acute. Twelve or fourteen uniserial vomerine teeth commence close to the small nasal disk. Palatine teeth biserial, from eighteen to twenty in each row; the outer ones inclined towards the corner of the mouth, acicular, not coming quite forward enough to meet the vomerine teeth; inner row a little taller, and inclined towards the mesial line. Mandibular teeth also biserial; the inner row not so tall as the outer one; both rows inclined the same way as the corresponding palatine ones. Gape of the mouth pretty large, and the jaws possess considerable lateral extensibility. Snout depressed, but when seen from above appearing conical and acute. The short tubular anterior nostrils have a very small acute snout projecting between them. Under jaw shorter and more rounded at the tip. A conspicuous row of pores on the limbs of the mandible, and many pores on the upper lip and snout. Eye over the middle of the gape.

Pectoral rather large, lanceolate, and supported by sixteen rays. Other fins low throughout. The dorsal commences over the tip of the pectoral, and ends, together with the anal, about two lines from the tip of the slender conical point of the tail. Lateral line a raised tube, with a series of pores beneath it. A fine white porous line crosses the occiput, makes a sudden rectangular flexure forwards on the temples, and then descends to the corner of the mouth. When the skin is viewed through an eye-glass, it appears to be finely furrowed longitudinally, both on the back and belly. The general colour is grayish-brown, which is due to a multitude of microscopic blackish dots on a fawn-coloured ground. The belly is whitish. There are from nineteen to twenty-one round milk-white spots on the lateral line, about the size of peas; the first one placed over the gill-opening, and five small white dots on the top of the neck over this lateral spot. A pale brown stripe runs on each side of the anal.

Length 13·5 inches. To anus 6·1 inches. To gill-opening 1·6 inch. Length of gape 0·65 inch.

HAB. Gulf of Mexico.

A specimen exists in the Museum at Haslar, and there is another in the British Museum. An *Ophisurus* in the Leyden Museum, labelled as having belonged to "L'ancien cabinet," is most likely referable to this species. The individual, in the same Museum, which is labelled "*Oph. guttatus* of Valenciennes," has larger white spots and a less acute tail; but I write from imperfect recollection, not having made descriptions or drawings of the Leyden fish.



## OPHISURUS PARILIS. Richardson.

Teeth slenderly subulate or acicular; the nasal ones standing on so narrow a disk as to appear clustered, with an odd one in front; about nine in all. Vomerine teeth biserial, numerous. Palatine teeth also biserial; both the rows even and pretty closely set; those of the outer row rather shorter, and inclined towards the corner of the mouth; the inner ones considerably inclined towards the mesial line, and extending forwards to meet the vomerine series at its commencement close to the nasal disk. Mandibular teeth biserial, extending from the symphysis to the corner of the mouth; the teeth in both rows inclined backwards; those of the inner row more closely set, and even.

Pectoral rather long, elliptical, acute. Dorsal commencing over the posterior quarter of the pectoral, ending with the anal close to the tip of the tail, both having previously expanded slightly, and being low throughout. Lower jaw a little shorter than the upper one. Eye placed over the middle of the mouth. Colour an uniform dull brown, paler beneath. (In spirits).

Length 19 inches. To anus 6·15 inches. To gill-opening 1·9 inch. Length of gape 0·8 inch.

HAB. West Indies. Specimen in British Museum.

## OPHISURUS DICELLURUS. Richardson.

*Ophisurus dicellurus*, Richardson, Ichth. Voy. of Sulph. p. 106, Pl. 48, f. 2, 3, 4. Report to Brit. Ass. Ann. 1845, p. 312.

The head is about as high as it is wide, but the body becomes gradually more compressed towards the tail. Snout bluntish, and very slightly passing the tip of the lower jaw. Gill-openings lax, and approaching nearer than usual in the gums to each other beneath. Teeth slenderly subulate, not long, inclined backwards. Vomerine teeth uniserial, larger, three in number. Palatine teeth biserial. Mandibular ones biserial in front, uniserial laterally. Pectoral ovate, acute, moderately large, supported by fourteen rays: dorsal commencing over its tip, and keeping at an equal height until near the end of the tail, where it lowers, and then dilates, so as to form with the anal, which is similar, an oval lobe, that rounds off at the tip of the tail more suddenly than it rises. The last rays of both fins are very short, and approach as near as possible to the extreme point of the tail, but do not go round it. The colour has faded in spirits, and if any markings existed they are no longer discernible. Lateral line distinct.

Length 9·55 inches. To anus 3·84 inches. To gill-opening 1·32 inch.

HAB. Estuary of the Yang tze keang, China.

I have not seen the *Ophisurus remiger* of D'Orbigny, which is a West Indian species, and resembles this one much in the form of the tail. (D'Orbigny, Voy. dans l'Amerique merid. Pl. 12, f. 2).

## OPHISURUS ROSTELLATUS. Richardson.

The snout is narrow, but rounded and slightly dilated at the end, exceeding the lower jaw very little. The nasal disk is bordered anteriorly by five small, subulate, acute teeth: a little farther back, on the mesial line, there is a stouter tooth, which is very acute, and in front of it two small subulate ones. The vomerine teeth are uniserial, the row commencing by two tall subulate teeth like the mesial vomerine one, with a small interval between them, and followed by seven closer set, recurved, subulate teeth. Palatine teeth biserial, the outer row being composed of about eighteen widely set subulate teeth, which are tallest near the middle of the gape, and become shorter and closer near the corner of the mouth. The inner row consists of twenty-eight more slender and very acute teeth, much inclined towards the mesial line and a little backwards, and not reaching so far posteriorly as the outer row, but going forwards to the nasal disk. Mandibular teeth biserial; the outer row more widely set, taller, and reaching from the symphysis to the angle of the mouth; the inner row resembling the inner palatine one, but confined to the fore quarter of the jaw, and terminating opposite the commencement of the outer palatine row. The jaws are narrow and expand laterally, like those of *intertinctus*, and in a much less degree than those of *regius*. The eyes are placed in the middle of the large gape, and the interval between them and the top of the head does not exceed the diameter of the orbit. The gill-openings are large. The pectoral is oval and large: the dorsal commences just behind its tip, is nowhere high, and lowers gradually to within three lines of the tip of the tail, where it terminates. The anal ends two lines from the tip, there being no previous expansion of either fin. Colour of the specimen kept in spirits chestnut-brown.

Length 33 inches. To anus 14·4 inches. To gill-opening 3·50 inches. Length of gape 1·85 inch.

HAB. Senegal. The Earl of Derby presented a specimen to the British Museum.

## OPHISURUS COMPAR. Richardson.

The uniform brown colour of this species and of the following one, after immersion in spirits, and their general form, renders them so like *O. caucricus* that an examination of the dentition becomes necessary for their discrimination.

Nasal disk armed with five short acute teeth, the odd one in front. Vomerine teeth uniserial, the row somewhat uneven, and the front pair close to the nasal disk standing abreast. Twenty-two conico-subulate, acute, palatine teeth, even and close set, ranged in a single somewhat undulating series. Mandibular teeth small and low, also conico-subulate and acute, numbering twenty-six on each limb, uniserial laterally, biserial in front. The mouth is small, the snout bluntish, and the lower jaw a little shorter. Eye nearer to the angle of the mouth than to the tip of

the snout. Pectorals large: the dorsal commences between their tips, and terminates with the anal close to the extreme tip of the tail. Both fins are very low posteriorly, but expand gradually and slightly before they slope away to the point of the tail. Colour of the fish, in spirits, an uniform brown.

Length 19·8 inches. To anus 7·5 inches. To gill-opening 2 inches.

HAB. Sumatra. A specimen in British Museum.

OPHISURUS REGIUS. Shaw.

"An. OPHISURUS OPHIS? Auctorum."

An *Ophisurus* in the British Museum, labelled as above, has the following characters.

Seven nasal teeth, ranged round the terminal border of the acute snout, and on the mesial line; more posteriorly there is a double row of six, set alternately three in each row, as in some *Muraena*. These are succeeded by a single row of thirteen on the vomer, both nasal and vomerine teeth being subulate, acute and recurved. The palatine teeth are biserial, and are all pretty long, subulate, more slender and very acute; the outer row is inclined backwards towards the corner of the mouth; and the inner one, which are rather taller, is inclined to the mesial line, and is preceded by a single row of four teeth, by which they are connected with the mesial nasal row. Mandibular teeth uniserial, curved backwards and inwards.

Head greatly depressed, so that the very small eye is on the upper surface. The breadth is great at the angles of the mouth, and diminishes evenly to the acute end of the jaws, which are of equal length, and are laterally very extensible. Anterior nostrils tubular, as usual, and placed on the side of the snout. Posterior nostril placed before the eye, preceded by a conical papilla on the edge of the lip, and covered by a membranous lid.

Body thickish for an *Ophisurus*, round throughout, and tapering towards the end of the tail. The lateral line, formed by an elevated tube with pores beneath at intervals, is conspicuous. The pectoral, supported by fifteen rays, is of moderate size, measuring six lines in length; and the dorsal, beginning half an inch behind its tip, ends a quarter of an inch from the end of the tail, while the anal ends a quarter of an inch farther forwards, or half an inch from the tip of the tail. The fins are tolerably high anteriorly, with conspicuous rays, and lower gradually towards their termination.

The specimen has been immersed in spirits many years, and many of its markings have doubtless disappeared. The tint of the upper parts appears to have been reddish or brownish. Twenty-three large pale brown spots or bars still exist on the lateral line; dots and lines of the ground colour traverse the spots; and the whole space, from the summit of the back to some way below the lateral line, is marked by small round pale brown spots, which occupy as much space as the ground colour.

Length 35 inches. To anus 18·5 inches. To gill-opening 4 inches. Length of gape 1·7 inch.

I think it probable that this may be the *O. ophis* of authors, but in that case Bloch's figure differs in the relative position of the anus and the greater length of naked tail, and fails in giving the characters of the depressed conical head and jaws.

OPHISURUS SERPENS. Linn. (*Muraena*).

Five marginal teeth at the extremity of the nasal bone, and nine longer, acute, subulate mesial ones, all posterior to the marginal ones. Thirteen short, acute, reflex, uniserial vomerine teeth. Palatine bone armed by an outer row of sixty short, compressed, acute, inclined teeth, which commence at the sixth mesial nasal tooth; and by an interior row of about twelve short, conical, acute teeth, just showing through the soft parts, set widely apart and not in a straight line. Under jaw armed laterally by a single even row of close-set, reflex, subulate teeth, like the exterior palatine ones.

Snout slender and pointed. Gill-rays, according to Cuvier, only twenty. Pectoral tolerably large. Body having a silvery or nacreous aspect, like many of the *Scombridae*.

Two specimens exist in the British Museum; one of them taken in the Bay of Naples, and the other in the Atlantic. In the Leyden Museum there is an *Ophisurus* from Japan, labelled *serpens*, but I had no means of instituting a comparison between it and the Mediterranean fish. Another similarly named, in the same Museum, is noted as having been captured at the Cape of Good Hope.

HAB. Mediterranean. Atlantic Ocean.

The *Ophisurus rostratus*, or *Ophisurus longicauda* of Quoy and Gaimard, Voy. du Freycenet, Pl. 51, f. 1, seems to be allied to *serpens*, but I have seen no example of it, and can therefore add nothing to the description to be found in the work above quoted. There is a considerable length of naked tail, the dorsal ending before the anal: the pectoral is pretty long, and the gape large, with the eye placed nearer to the angle of the mouth than to the end of the snout.

OPHISURUS VIMINEUS. Richardson.

*Ophisurus vimineus*, Richardson, Ichth. of Sulphur, p. 107, Pl. 52. f. 16—20. Report on Fish of China, p. 314.

This *Ophisurus* stands by itself in the genus, in having an elongated acute snout, minute pectorals, and no visible vertical fins. The teeth are short, subulate and very acute. Four are placed alternately in two rows on the narrow nasal disk. The palatine teeth are uniserial, recurved, and meet in front behind the nasal disk. Mandibular teeth also uniserial. No vomerine teeth could be perceived, but this was probably owing to their minuteness, and the roof of the mouth having been injured.

Head small. Snout slender, acute, projecting much beyond the mandible. The tubular anterior nostrils placed on each side near the tip. Throat elastic, from the interlacing of the gill-rays, of which at least twenty-two can be made out through the integuments, but it is probable that the correct number is more. Gill-openings small, lateral.

Body slender, round, verniform, tapering a little towards the acute point of the tail, which is very slightly compressed. Pectoral minute, transparent, and scarcely visible, except by aid of a lens. It is supported by eight rays. Thirty-three chestnut-brown bands, not quite meeting on the belly, alternate with an equal number of rather narrower white ones, the tip of the tail being dark.

Length 8 inches. To anus 3·8 inches. To gill-opening 0·5 inch. Height of body 0·13 inch.

HAB. China.

### CONGRUS.

The British Museum possesses comparatively few *Congrus*, and I have not had an opportunity of examining an extensive series elsewhere, but, as far as I have ascertained, the genus differs from *Anguilla* by the definite character of the absence of dermal scales, as well as by those noticed by Cuvier in the *Regne Animal*,—the more prominent snout and forward origin of the dorsal fin.

The species which I have seen may be arranged by their dentition as follows.

1. Palatine and mandibular teeth slender, but chisel-shaped at the points, and arranged so closely as to produce an incisorial edge.  
*Congrus vulgaris*; *C. leucophæus*.
2. Palatine and mandibular teeth acerose or acicular, and villiform.  
*C. myrus*; *C. lepturus*.
3. Teeth mostly conical, and more or less blunt.  
*C. habenatus*.
4. Vomerine teeth strong, compressed, sharp-edged and tricuspid. Mandibular teeth resembling the vomerine ones. (MURENEX, Mc Clelland).  
*C. proteus*; *C. tricuspidatus*; *C. angustidens*; *C. brevicuspis*; *C. hamo*.
5. Vomerine teeth tricuspid. Mandibular teeth like the palatine ones. (MURENEX, Mc Clelland).  
*C. curvidens*.

### CONGRUS VULGARIS. Auctorum.

*Muraena conger*, Bloch, 155.

The skull of the common conger of the British Channel has much the same shape posteriorly with that of *Muraena*, but the hypotympanic pedicle of the lower jaw inclines forwards, so that the strong bony preoperculum, and equally large but thinner interoperculum, do not project

backwards beyond the occiput. The operculum, which is also strong and moderately large, has a deep crescentic notch in its upper border, embracing more than a quarter of the otherwise circular circumference of the bone. The narrow meuseoid suboperculum borders the under half of the operculum. Taken together, the gill-plates and the branchiostegous rays are not inferior in size and strength to those of many acanthopterygian fishes, and far exceed the delicate and diminutive opercula of the *Muraena*. A bone, which may be considered as the confluent pterygoid and entopterygoid, and which does not exist in *Muraena*, has the shape of a long plate, forming the floor of the orbit. Its anterior end joins the prefrontal process of the vomer underneath the groove, for lodging the olfactory nerve, and its posterior end is partly confluent with the hypotympanic, partly joined to it by suture. The palatine, as in *Muraena*, performs the ordinary function of the maxillary bone, but it is shorter and stronger than in that genus, and is articulated by a flat head to the side of the vomer and hinder part of the small nasal disk, at the fore part of the olfactory sac, close to the end of the snout, the prominent tip of the snout being formed by the nasal disk or chevron. In *Muraena*, the articulation of the end of the palatine with the preorbital process of the confluent vomerine and nasal bones is just at the border of the orbit. In the common conger, the large triangular preorbital flanks the end of the snout, covering the anterior third of the palatine. The rest of the suborbital chain remains in the condition of a cartilaginous tube, except a short piece at the posterior inferior angle of the orbit, which is ossified. The integuments of the side of the snout, and part of the upper lip, are strengthened by a tough ligamentous substance, approaching to cartilage in firmness. The *Congrus mystax* is described by Laroche as having two transverse bony rays in the upper lip of each side, but I cannot help suspecting that he alludes to the preorbital and the posterior ossified portion of the suborbital chain. In *Congrus communis*, the uro-hyal is a strong bone, nearly cylindrical in the middle, dilated anteriorly, where it is attached to the basi-hyals, which are confluent with the stout cerato-hyals, and compressed posteriorly at its connection with the lower points of the firm well-developed coracoid bones. The gill-rays, nine in number, are also strong and rigid, except towards their points, and all the parts of the hyoid bone and humeral arch are much firmer and stronger than in *Muraena* or *Ophisurus*. The stomach is a long, thick, cylindrical sac, with a short, narrow, slightly tapering, obtuse, caecal process at its fundus. The pyloric orifice is near the top, leaving eleven parts of twelve in the length of the viscus beneath it, and the canal passes obliquely through the coats of the stomach, ascending till it reaches externally the junction of the œsophagus; it then makes a sudden turn, and runs downwards along the back of the stomach, a valve being formed at the curve by an inflection of the inner coat of the gut. At the lower quarter of the stomach, the gut, still tied down to it by a short mesentery, makes three loops, which, together with five or six valvular inflections of the inner coat at the several curves, perform in some degree the functions of a spiral valve, by detaining the alimentary matters in their passage, and giving in-

creased surface for absorption. The gut ends in a short, straight and rather wider canal, which arrives at the anus very soon after passing the cœcal point of the stomach.

The end of the snout is formed by the rounded extremity of the nasal bone, whose dental disk, nearly twice as broad as it is long, is closely set with small, short, stoutly subulate, acute, somewhat recurved teeth. A smooth furrow separates this disk from the rather prominent elliptical dental surface of the vomer, which is armed with similar teeth, but which are less crowded on the mesial line. The vomerine teeth do not go so far back as the prefrontal process. The principal series of teeth on the palatines, when looked at *in situ*, appear to be slenderly cylindrical, somewhat like the teeth of a *Chaetodon*, but they are in fact wedge-shaped, being transversely wider at the base, and obliquely chisel-shaped and acute on the edge. Being very closely and evenly set, the series as a whole is incisorial. Close to their roots interiorly a few minute teeth may be detected, situated so as to be ready to replace any of the main series that may be injured; and at a very small interval there is a very low, even row, forming an interior acute ridge, just visible above the soft parts. Near the symphysis this ridge terminates in a narrow band or cluster. On the outside, near the anterior end of the palatine bone, the main dental ridge is supported by a villiform band of small subulate teeth, which is broadest where it touches the nasal disk, and tapers off to a point posteriorly, not reaching above one-third of the length of the bone. The mandibular teeth are similar to the palatine ones, but the outer villiform cluster at the symphysis is broader. The small inner teeth of both jaws are concealed by the soft parts in the recent fish. The upper and under pharyngeals are densely covered with very fine villiform teeth, which are slightly coarser on the inner borders of the bones.

The pretty large, ovate pectoral is supported by seven-teeth rays. The dorsal commences over the last quarter of the pectoral, and contains about three hundred rays, while the anal is supported by two hundred and fifty. They are bordered with black, as is the case in the majority of *Congers*. The lateral line has a series of white pores beneath it.

Length from 5 to 7 or 8 feet.

HAB. European Seas.

#### CONGRUS LEUCOPHÆUS. Richardson.

Small subacutate teeth, densely crowded at the end of the upper jaw, the cluster ending posteriorly in a short acute point, just behind the articulation of the palatine bones to the nasal disk, that is, extending a very short way on the vomer. Palatine and mandibular teeth uniserial, and evenly and closely set, producing an incisorial ridge, as in the common conger. Their cusps are compressed, acutedged, or chisel-shaped, and oblique enough to form an angle or point posteriorly. A few at the fore end of the mandible are more pointed, and not so closely and evenly set. The head is depressed and flattish above, the snout rounded. The dorsal begins just behind the tip of the

pectoral, and, with the anal, is of a pale colour, distinctly bordered with black. The body, after maceration in spirits, is brownish.

Length 19½ inches. To anus 7¼ inches. To gill-opening 2½ inches.

The specimen exists in the British Museum, but without any record of its native place.

#### CONGRUS MYRUS. Risso?

*Murana myrus*, Risso, Ichth. de Nice, p. 20?

I have referred the conger whose description follows to the *myrus* of authors, chiefly because of the white lines about the occiput, and on account of its habitat. It does not agree at all with Lacépède's figure 2, Pl. 3, f. 3, in the position and size of the eye.

Roundish or slightly oval nasal disk, armed with short, conical, acute teeth, biserial on the border, the outer series formed of about fifteen, and the inner one of eight; in addition to which there are two on the mesial line larger than the others, the posterior one being placed a little behind the circle of the disk. Dental surface of the vomer elliptical, and acute at both ends, armed with small teeth of various sizes, some of them flattish and rounded, others more acute. About six stand abreast in the middle of the ellipse. Palatine teeth acroere or short, slender, cylindrical and more or less acute, crowded without order, but standing four or five in the width of the bone, which abuts anteriorly against the nasal disk. The mandibular teeth are similar to the palatine ones, but form a slightly narrower band.

The body of this conger tapers considerably. The head is longish and narrow. The snout is obtuse when seen from above, but being rather depressed looks acute in profile. The eyes are large, and placed rather more than a vertical diameter of the orbit apart, over the posterior angle of the mouth. The gape is large, exceeding the moderate-sized pectoral in length. The lateral line is formed by a series or chaplet of little elliptical elevations, with white dots at intervals. The dorsal begins over the tip of the pectoral. The fins are pale, with black edges. The body is brownish-gray above, after maceration in spirits, the colour being partly produced by densely-crowded very minute dark ash-gray dots; and the belly is whitish, with thinly set blackish dots. A porous white band crosses the occiput; another runs along the temples, over the base of the pectorals; one passes under the eye, and the pores form variously figured lines on the snout. There are also three short longitudinal white bars on the top of the head, before the transverse occipital band.

Length 23½ inches. To anus 9½ inches. To gill-opening 2½ inches.

HAB. Bay of Naples. Specimen presented to the British Museum by J. Pratt, Esq.



## CONGRUS LEPTURUS. Richardson.

*Congrus lepturus*, Richardson, Ichth. Voy. of Sulphur, p. 106, Pl. 56, fig. 1-6.

Teeth acicular. The nasal ones disposed in two rows of five each, the posterior outer one on each side being the tallest. The vomer is armed in front by two teeth, like the latter one, one before the other. The palatine teeth are biserial, the rows being regular, with a space between them, and the inner row rather taller and abutting against the nasal disk before the vomerine teeth. Mandibular teeth like the palatine ones, and biserial, but at the symphysis there are three rows, the posterior row being formed by four acicular teeth behind the other two rows.

Tail tapering and slender, and more acute than in most congers. Lower jaw nearly as long as the obtuse snout. Dorsal commencing over the axilla of the pectoral. Gill-openings rather large, the space between them on the throat about equal to the length of one opening.

Colour bluish-gray above, pale or whitish below; the fins pale and edged with black.

Length 9 inches. To gill-opening 1.05 inch. To anus 2.7 inches. To dorsal 1.15 inch.

HAB. China Seas.

## CONGRUS HABENATUS. Richardson.

RADI:—B. 8; D. 184; A. 122; = 306; P. 10.

Plate L., figs. 1-5.

This species differs from the preceding ones in its dentition, the teeth on the roof of the mouth being fitted for crushing or grinding the food.

Body thicker than the head, nearly cylindrical, its height exceeding its transverse diameter only by one-fifth (fig. 5), the compression augmenting rapidly between the anus and tip of the tail. The muscular flakes are very visible through the smooth, shining, silvery skin; and the lateral line, which gradually descends from the nape to the middle height, which it attains some way behind the anus, is marked out by a series of pores, commencing at the occiput. A depression, descending from the occiput, separates the muscles of the cheek from the gill-cover. The eye is large, encroaches on the profile, and is contained rather less than four times and a half in the distance between the end of the snout and the gill-opening. The space between the eyes is less than the vertical diameter of the eye-ball. Snout rather broad and obtuse. A mesial fold of loose skin, uniting with the upper lip, gives a bridled appearance to the snout. The posterior nostril is open, and is situated just before the eye; the anterior one is a short tube, placed on one side of the tip of the snout. The under jaw is shorter than the upper one, and the gape of the mouth is cleft to beneath the centre of the eye. The upper lip, commencing just behind the tubular an-

terior nostril, runs back to the angle of the mouth, where it curves over the end of the lower lip to be inserted into the lower jaw. It is continuous with the integuments which cover the preorbital and suborbital chain, and is separated anteriorly by a deep furrow from an inner lip or swelling gum, which runs along the base of the palatine teeth. Three small cartilaginous bodies are imbedded in that part of it which is attached to the preorbital, and are seemingly connected with pores on the edge of the lip. The under lip is broader and folds back on the sides of the lower jaw, but runs evenly to the roots of the teeth, without any interior furrow as in the upper lip. Conspicuous pores exist on the end and top of the snout, on the upper lip, the suborbital chain, across the head behind the orbits, on the hinder part of the mandible, and across the occiput, where they connect the lateral lines with each other.

The nasal teeth are conico-subulate, short and acute, and stand in a small, dense, triangular cluster, on the point of the jaw, anterior to the apex of the mandible when the mouth is closed. They are followed, without an interval, by four rows of flatly-rounded vomerine teeth, the middle rows containing the largest ones. The vomerine teeth extend as far back as the front of the eye. The palatine bones are armed by an even, outer series of somewhat subulate, but not very acute teeth, with interior, rounded, granular ones considerably lower, and about three deep, but not ranged in determinate rows. The mandibular teeth are similar to the palatine ones, but the dental surface increases gradually in width from the corner of the mouth to the symphysis, where the teeth are five or six deep (figs. 4 and 5). Tongue smooth.

The distance between the end of the snout and the gill-opening is equal to one-sixth of the total length, and the anus is a little anterior to the middle of the fish. The dorsal commences over the axil of the pectoral or lower angle of the gill-opening, and its rays are more delicate and crowded towards the end of the tail, where it unites with the anal. The pectoral is rather small.

The stomach is caecal, wide and obtuse, and, in the individual here described, was completely filled by a large shrimp, which was doubled up, and but little broken. It has no small appendix such as exists at the fundus of the stomach of the *Congrus vulgaris*. The gut goes off from a funnel-like recess at the upper end of the stomach, and descends straight to the anus, being bound to the stomach by membrane as far as that viscus extends. The stomach and rather more than half the gut were of a purplish-black colour, apparently proceeding from their contents, the under part of the canal, below the fundus of the stomach, being pale. The air-bladder, long and slender, descends as low as the anus: its lower end tapers, and its upper one divides into two tapering branches, one of the branches being continuous with the tube which communicates with the œsophagus. The heart and pericardium have a shining nacreous appearance, and are connected to each other by strong membranous bands. This individual was killed when spawning; its belly being full of roe, and the eggs were in the act of passing through the distended anus.

Length 12.7 inches. To anus 5.7 inches. To gill-

opening 2·1 inches. Height of body 0·75 inch. Thickness 0·60 inch.

HAB. Cook's Strait, New Zealand.

CONGRUS PROTERVUS. Richardson.

The head only of this species is preserved in the British Museum, and the locality where it was taken is unknown. It belongs, with those that follow, to McClelland's genus, *Muraenosox*, but I have not been able to identify any of the specimens that I have seen with the species which he has figured and described in the *Calcutta Journal of Science*.

Nasal disk a nearly circular dilatation at the end of the narrow upper jaw, set round its anterior half with four subulate acute teeth, inclined backwards, and a smaller tooth enveloped in the soft parts between each pair. There is a deep smooth cavity on each side of the mesial ridge behind the nasal disk; the ridge itself is undulated, being first depressed in a curve and then arched. The descending curve behind the nasal disk is armed by a row of four acute conical teeth, scarcely visible to the naked eye; and after a small interval follow fifteen tricuspid and pretty large teeth, on the arched part of the vomerine ridge. These teeth are compressed, with an acute anterior and posterior edge, and very sharp central cusps. The lateral cusps are small and rounded, and placed near the roots of the teeth; they are largest on the posterior teeth. The seventh, eighth and ninth of the tricuspid teeth are the largest, the anterior and posterior ones diminishing gradually as they recede from them. The series is flanked on each side by many small, compressed, but obtuse and rounded teeth, not set in regular order, but in some places placed three or four deep, in others only one. Palatine dental surface a long narrow ellipsis, acute at each end, and covered with many small teeth, like the lateral vomerine ones, the outer marginal ones being larger, and rising above the rest; and in the middle of the concave dental plate there is a smooth, irregularly wide, line, on which the teeth are not developed. The palatine teeth come in contact with the vomerine series at the seventh vomerine tooth, just before the posterior nostril. The lateral mandibular teeth are like the mesial vomerine ones, but the series is more even, and the basal lobes less evident. Minute compressed and blunt teeth flank each side of the principal series, mostly, but not wholly, arranged in one row. The symphyseal apex of the mandible forms an oval disk, which is armed, on the margin on each side of the symphysis, by nine small, acute, subulate teeth; and there are on each side within the disk three tall, stout, subulate, very acute teeth, the middle one of each side being the tallest.

Anterior nasal-openings small, tubular, on each side of the snout; posterior ones before the eyes, midway between the mouth and top of the forehead. Eyes, over the posterior third of the mouth, silvery. Head brownish and mottled.

HAB. Unknown.

CONGRUS TRICUSPIDATUS. McClelland. (*Muraenosox*).

*Muraenosox tricuspidata*, McClelland, *Calcutta Journ.*, iv, t. 21, f. 1. Richardson, *Ichth. Voy. of Sulphur*, p. 105, Pl. 51, f. 2. Icon. Reeves, a. 41. Hardw. 295, Brit. Mus.

Nasal teeth long and strong, three on each side of the symphysis. Vomerine teeth uniserial, tricuspid, the middle cusp being much larger and taller than the lateral ones. The largest tooth is the third from the last, and the others gradually diminish in size as they recede from it. In some of the small anterior ones the lateral cusps are obsolete, but they are sufficiently distinct in the nine posterior ones. Palatine teeth uniserial, small, sharp-edged, but not pointed, ranged in an even cutting series. When examined by a lens, these teeth show a slight indication of side lobes. Mandibular teeth, like the palatine ones, with an outer row of small, acute and closely-set teeth. At the end of the jaw there are three tall subulate teeth on each side of the symphysis. The dorsal commences over the gill-opening. Lateral line marked by a series of oval white spots. In the recent fish the colour of the upper parts is oil-green, with a glazing of duck-green along the lateral line and top of the head. The vertical fins edged with black.

Length 15 $\frac{3}{4}$  inches. To anus 5·4 inches. To gill-opening 2·1 inches.

HAB. Coasts of China and India. The Chinese name is the "hook-nosed" or "stork eel."

CONGRUS ANGSTIDENS. Richardson.

Nasal disk armed by eight tall, subulate, marginal teeth, and three small subulate ones on the mesial line. Vomerine teeth eight, distantly set, taller and much narrower than those of *protervus*, with sharp edges, and a very acute tapering point, the lateral cusps being small, narrow and obtuse. In front of these, on the mesial line, close to the nasal disk, there are three small acute teeth; and on each side an irregular row of compressed teeth, of various sizes and heights, the bigger ones approaching the large tricuspid ones in form. Palatine teeth small, ranged exteriorly in an even row composed of lanceolate, rather acute, cutting teeth, with small ones at the base of the row outside, standing for the most part, but not regularly, two deep; and interiorly forming a band of short, slender, cylindrical obtuse teeth, placed two or three deep. Mandibular teeth, like the principal vomerine ones, not much smaller, but very slightly inclined backwards and close set. They are highest in the middle of the limb of the jaw, and become gradually lower in each direction. There are one or two irregular rows of minute granular teeth within, and on the outside of the chief series there is a very even row of small, rounded, compressed teeth. The disk at the end of the jaw is bordered with acute and subulate teeth, and there are on each side within, four stout, subulate, tall and very acute teeth. The lower jaw is conspicuously shorter than the upper one. Eye

three diameters from the tip of the snout, and three-quarters of a diameter from the corner of the mouth, whose gape is equal to four diameters and three quarters. Pectoral very long, equal to three-fourths of the length of the gape.

Length 37 inches. To anus 16 inches.

HAB. China. The British Museum possesses a dried specimen which was presented to it by John Reeves, Esq.

#### CONGRUS BREVICUSPIS. Richardson.

Nasal disk bordered on its anterior half by about ten moderately tall and strong subulate acute teeth, and in the middle of the disk there are nine small conical acute ones, placed so as to represent a cross with short lateral arms. The depression of the vomerine ridge next the nasal bone is considerable. The nine principal vomerine teeth have short acute middle cusps, with larger rounded lateral ones than in *proterus*, and they are flanked on each side by a row of compressed, rounded, oblique cutting ones, neither closely nor evenly set. The outer row of palatine teeth is composed of evenly-set, compressed, obtuse cutting teeth. The long elliptical dental plate is wholly covered with innumerable minute rounded teeth, without any smooth space in the middle. The palatine teeth abut against the vomer at the sixth tooth. The mandibular teeth are like the vomerine ones, but they are not so regular, the alternate ones being often, but not uniformly, lower. The outer row is composed of even, close-set, semicircular, sharp-edged small ones, applied to the base of the chief row, and the inner ones can scarcely be detected. The disk at the end of the mandible is armed by five or six acute, subulate, marginal teeth, and three taller ones within on each side, the posterior pair being high and stout.

The eye is placed three diameters of the orbit from the end of the snout, and a diameter before the corner of the mouth, whose gape is equal to five diameters of the orbit. The space between the eyes is transversely convex, and its breadth rather exceeds the vertical diameter of the orbit. The pectoral is elliptical and long, and the dorsal commences over the gill-opening.

Colour, in spirits, pale brown above, silvery beneath. The fins silvery and black-edged.

Length 23 inches. To anus 9½ inches. To gill-opening 3¼ inches. Specimen in the British Museum.

HAB. Unknown.

#### CONGRUS HAMO. Schlegel.

*Congrus hamo*, Temm. et Schl. Fauna Jap. p. 262, Pl. 114, fig. 2.

Jaws generally similar to those of *proterus*, but the nasal disk is less dilated, and the vomerine arch not so curved. Nasal teeth about six, with small ones in the soft parts between. Vomerine teeth, four or five small mesial ones on the slightly depressed part of the ridge next the

vomer. Six conspicuous tricuspid mesial ones on the arch of the ridge, having small obtuse basal lobes. The small teeth on each side of the mesial ones are close-set and uniserial, but not very regularly so. Palatine dental surface a long narrow ellipsis, as in *proterus*, and the teeth very similar; an outer regular row, a smooth space in the middle, and an inner band two or three deep where widest. The palatine teeth meet the vomer at the third tooth. Mandibular teeth like the vomerine ones, but the principal series uneven, that is, there is a lower and less sharp tooth generally, but not uniformly, between each pair of taller ones. The outer series of minute ones have chisel-shaped, acute, oblique cusps, and form an incisorial row. The inner ones are in a single row very close to the bases of the principal series. The rounded dilatation at the end of the mandible is armed on the margin by a series of small teeth, and on each side within by three subulate ones, the posterior one being the tallest. The dorsal begins before the gill-opening. The snout is slender, and the eyes are placed about two diameters and a quarter of the orbit from the tip of the snout, and half a diameter anterior to the corner of the mouth. Gill-rays about twelve in number. The colour of the specimen, which is preserved in spirits, is pale brown, minutely dotted with black; the sides and belly silvery. The fins also silvery, with black edges. Lateral line a series of short tubes, with intervals between them.

HAB. Philippines. Specimen in the British Museum obtained from Mr. Cuming. South-west coasts of Japan (*Fauna Japon.*)

#### CONGRUS CURVIDENS. Richardson.

Nasal teeth stoutly subulate, stronger than in other species, ranged in a cluster without order, the tallest in the middle, followed on the mesial line by four minute round ones in two rows, which may be considered as the anterior vomerine ones. The mesial row of tricuspid vomerine teeth, placed on the ridge of the bone, which is arched, have oblique curved cusps, and are close set. The lateral cusps are small, round, and at the root of the tooth. In the posterior teeth the central cusps are worn down to the level of the lateral ones. Small teeth on each side of the principal series, rounded, not compressed, and of unequal sizes, not disposed in rows, and seldom more than two abreast. Palatine teeth of the principal row rounded on the crowns, but generally with a mesial acute line: there is an irregular row of minute granular teeth on the outside, and a band of two or three on the inside, with a furrow between them and the main series. The palatines abut against the vomer at the sixth tooth. The mandibular teeth, instead of being like the vomerine ones, as in the preceding species, more resemble the palatine teeth in the principal series; and there is also a row of uneven granular teeth on the outside, and two irregular rows on the inside. Twelve subulate but not very acute teeth border the end of the mandible, and there are two taller subulate ones within the half circle on each side.

Eye large, placed a diameter and a half of the orbit from

the end of the snout, and half a diameter from the corner of the mouth. Lateral line a series of short tubes, each having a porous mouth posteriorly, and beneath an oblong mark. The gill-rays are seventeen, and the dorsal commences over the gill-opening.

Length 27 inches. To anus 13.5 inches. Length of frictus of mouth 3.5 inches.

A dried skin preserved in British Museum.

HAB. Unknown.

We must refer to Dr. McClelland's able paper so often quoted for the Indian species of *Muraenesox*, of which he describes six species, viz., *M. tricuspidata*, above noticed; *M. lanceolata*, which has biserial mandibular teeth, and the vomerine teeth with a single lanceolate cusp, the lateral cusps being absent, or at least obsolete; *M. exodentata*, with triserial mandibular teeth, the points of the exterior row directed horizontally outwards; *M. serridentata*, distinguished by serrated vomerine teeth. Dr. McClelland considers this species to be the *Ophidium talabon* of Russell (38); and among Hardwicke's drawings of Indian fish, preserved in the British Museum (No. 292), I find one marked *Congrus talabon* (Gray), with a reference to Russell, which shows the dorsal commencing far before the gill-opening, and a tapering pointed tail. Its colour is darkened by minute crowded black dots. No. 294 in the same collection of drawings is named the "Jungle conger," and is of a pale greenish and silvery hue. Its rays are stated to be Br. 7, D. 138; A. 108, C. 24 = 270. An enlarged sketch of the jaws in figure 296 shows it to be a *Muraenesox*, probably allied to *curridens*. The Chinese *Congrus fasciatus* of Gray (Richardson's Report on the Ichth. of China) is figured in Nos. 291 and 293 of the same collection. It has an ochre-yellow ground, but with irregular purplish-black blotches descending from the dorsal fin to the middle of the sides, several of them enclosing spots of the ground colour. The top of the head is black, with three dark spots on the hind head. The cheeks, under surface of the head and the anal, have the bright ochraceous ground tint, the fin being edged with black. The dorsal and pectorals are mountain-green. I have seen no specimen of this fish.

Since this sheet was set up in type the fifteenth decade of the *Fauna Japonica*, containing the Congers, has reached me. M. Schlegel enumerates *Congrus vulgaris* among the Japanese fish, but says, at the same time, that having only a dried specimen to judge from he cannot be certain of its absolute specific identity with the common conger of Europe. The next species, *Congrus anayo*, Pl. cxiii, fig. 1, differs in aspect from any that we have described, and is considered by M. Schlegel as the analogue or representative of the *Muraena balerica* of Delarocche, *Ann. du Muséum*, tome 13, p. 327, Pl. 20, fig. 3. *Congrus hano* belongs to Dr. McClelland's genus *Muraenesox*, and seems to be identical with a conger in the British Museum, which was discovered in the Philippines by Mr. Cuming. I had given this specimen a provisional specific appellation, which I have changed for *hano* since the fortunate arrival of the decade of the *Fauna Japonica* before the sheet was printed off. M. Schlegel states that the *talabon* is the common species of the equatorial seas, and mentions the Straits of Sunda as

one of its habitats, but none of the specimens from the Malay Archipelago which I have seen show the characteristic serratures of the teeth which have been noticed by Dr. McClelland, whose excellent opportunities for studying the fish described by Russell and Buchanan-Hamilton give great weight to his authority in the determination of their species.

As to *Conger urolophus* and *C. uropterus* of the *Fauna Japonica*, they are evidently *Ophisuri*, having the naked tip of the tail, the lobed upper lip, form of the gape, and comparatively small eye, which distinguishes the *Ophisuri* from the *Congri*; and I doubt not but dissection would show the numerous hair-like gill-rays of the genus. *Ophisurus urolophus* seems to be distinct from any that we have described, but *O. uropterus* is perhaps identical with *O. sinensis* of this work, p. 98. *O. porphyreus* is quite distinct from any species in the British Museum, and it appears to have small teeth on the entopterygoid,\* as well as on the usual dentiferous bones, for so I understand M. Schlegel when he says "Il existe des dents dans l'intermaxillaire, dans les machoires, dans le vomer, et dans les palatins, et elles sont dans tous ces os distribuées sur une seule rangée, pointues, un peu comprimées et un peu dirigées en arrière. Celles des deux tiers antérieurs du vomer sont au nombre de trois, et assez vigoureuses et grandes, leur largeur égalant le diamètre de l'œil; celles de deux tiers antérieurs de la mâchoire inférieure sont au nombre de trois à quatre, et de plus de moitié plus petites que ces grandes dents vomériques; les dents des autres parties sont plus petites encore, et peu serrées."

*Muraena kidako*, p. 266, Pl. cxvii, and *M. albimarginata*, p. 267, Pl. cxviii, differ from any that we have described; but it is probable that *M. pardalis* will prove to be merely the adult of *M. paronina*, p. 90 (Ichth. of Voy. of Sulphur, p. 110, Pl. 53, f. 1—6), and also the "*calamaia paum*" of Russell, xxxii., and perhaps the *M. punctata* of Schneider, though there are some differences in the figures and descriptions to reconcile. The figure in the *Fauna Japonica* wants the elongated tubular pores on the points of the snout and mandible, which were conspicuous in our smaller specimen.

#### ANGUILLA AUSTRALIS. Richardson.

*Anguilla australis*, Richardson, Zool. Trans. iii. p. 157.

#### Plate XLV., figs. 1—5.

This eel is proportionally a more slender species than *labrosa*, and its lips, which have the same structure, are less thick and large. Its profile is depressed or slightly concave before the eye, and its snout rounded at the end. The eye is moderately large for an *Anguilla*, and is placed over the angle of the mouth. The anus is before the mid-

\* That is, if this bone exists in the genus, which I do not know for certain, as I have not seen a skeleton of an *Ophisurus*.



dle of the fish, and the distance between it and the gill-opening falls a little short of one-third of the whole length of the fish. The dorsal commences about the eighth of an inch before the vent in the specimen here described, which is equal to a fifth or sixth part of the vertical height there. In the figure (Plate XLV.), owing to the bend given to the body by the artist, the dorsal appears to come farther forward than it actually does. The whole integument of the body, fins and head, is covered with minute delicate scales, arranged in the same lattice-work way as in *labrosa*, the individual scales being oblong, oval and more obtuse at one end, but not tapering so much towards the apex as in that species. Under the microscope the scales appear to be entire at the edges, and their disks show concentric rows of cells. The lateral line is a continued porous tube, and is conspicuous enough from the gill-opening to the end of the tail. The whole skin is perforated by innumerable minute raised pores, which are particularly conspicuous on the inside of the upper lip, the tongue and roof of the mouth, looking through a lens like villi. The pores of the upper lip terminate near the teeth by a well-defined line, which appears as if fringed by them. The dental surfaces of the several bones are slightly convex, and set densely in a villiform manner with short, slender, cylindrical, acute teeth, not ranged in definite rows. The dental plates are broadest at the symphyses of the jaws, and taper gradually towards the corners of the mouth, but not so much as represented in figures 3 and 4, nor do they end so acutely. The palatine bones flank the nasal bone to the edge of the snout, but, owing to their lateral position and the rounded form of the snout, they do not run quite so far forward as the end of the nasal bone. The lower jaw is slightly longer than the upper one. Pectoral small.

Length of the Tasmanian specimen, which is figured in Plate XLV.,  $17\frac{1}{2}$  inches. To anus  $7\frac{1}{2}$  inches. To gill-opening 2 inches. Another specimen, from Auckland Islands, measures 19 inches. To anus 8·6 inches. To gill-opening 2·4 inches. And one from New Zealand, which was presented to the British Museum by Dr. Sinclair, Colonial Secretary, measures 18 inches in length, 8·2 inches to the anus, and 2·3 inches to the gill-opening. This example is proportionally thicker in the body, and its dorsal commences half an inch before the anus, which is farther forward than in the others. Its eyes are not symmetrically placed, the left one being over the corner of the mouth, and the right one a little farther forward, but its dentition corresponds with *australis*, and I can detect no specific differences.

HAB. Tasmania. New Zealand. Auckland Islands.

#### ANGUILLA DIEFFENBACHII. Gray.

*Anguilla dieffenbachii*, J. E. Gray, Dieffenbach's Travels in New Zealand. Append. p. 225.

This eel has a larger pectoral than *australis*, and its dorsal begins an inch before the anus in a specimen 17 inches long, but, on examining the individual contained

in the British Museum, I detected no other difference between it and *australis*.

#### ANGUILLA AUCKLANDII. Richardson.

Plate XLV., figs. 7—13.

In this species the height of the body, and especially of the tail, is greater than in *australis*; and the end of the tail with the fins spread out is more rounded, the lips are less porous, and the tongue more pointed. The teeth also are disposed in narrower bands, and the vomerine patch tapers more and runs farther back. The most tangible difference, however, is in the origin of the dorsal, which is considerably farther forward. The eye also is placed rather before the corner of the mouth, not over it. The profile of the forehead is more concave, and the two jaws are more nearly equal in length.

Length of the fish 20 inches. To anus 9 inches. To gill-opening  $2\frac{1}{2}$  inches. To beginning of dorsal 6·8 inches. Distance between gill-opening and anus  $6\frac{1}{2}$  inches. The dorsal begins before the anus almost 2 inches, or  $4\frac{1}{2}$  inches posterior to the gill-opening.

HAB. Auckland Islands.

#### ANGUILLA LABROSA. Richardson.

The eel described below was taken by K. L. Sutherland, Esq., Paymaster and Purser of the 'North Star' in the South Seas, but the exact locality is not recorded, and we do not know whether it be a fresh-water or marine fish. It has the general aspect of an eel, and also the conspicuous tessellated scales which many of the true *Anguilla* possess; but its dorsal, commencing rather nearer to the gill-opening than to the anus, excites a doubt as to whether it ought not to be classed with the Congers, which are artificially separated from the *Anguilla* by the more anterior commencement of the dorsal. In the nature of the dentition *labrosa* is allied to *Anguilla brevirostris* of McClelland (Calc. Journ. t. 5, f. 1), but the forms of the dental plates are not precisely the same.

The skin is clothed throughout, except on the lips, with narrow oblong scales, which taper considerably at one end, but are not absolutely acute. When examined with a microscope, their edges are perceived to be quite entire, and their whole disks to be densely studded with oval and rounded cells. *In situ* the scales are ranged in short rows, which meet each other nearly at right angles, and, being covered with a darker pigment than the dusky brown integument, are very conspicuous, giving a tessellated or interwoven appearance to the surface of the skin. The scales cover the fins, as well as the body and head. The head is depressed, flatly rounded on the top, and wider at the gill-openings than it is high. The compression of the body begins immediately behind the pectorals, and increases to the end of the tail, which, with its investing fins,

is much rounded in the outline of the tip. The depression of the head augments to the end of the snout, which has very little vertical height, and is obtuse transversely; it nearly equals the lower jaw in length, and its breadth is augmented by thick scaleless lips, that can be made to stand out laterally like wings. In this position the breadth of a single lip is equal to three-fourths of the width of the snout, and it gradually narrows off to the corner of the mouth, just in the same proportion that the width of the jaw increases. The under jaw is furnished with a lip of similar shape and size, pierced by rows of large pores, and the scaly integument, ending abruptly at the bases of both lips, produces at first sight the appearance of an exterior lip, but there is not actually a distinct fold of the skin there. The short tubular anterior nostrils are placed on the margin of the snout, just where the lip joins it, and the naked circular orifice of the posterior one is on a level with the upper margin of the orbit, and about one-third as far before it as the eye is distant from the anterior nostril. Eye small, and situated over the posterior third of the mouth, which is of the usual size in the *Anguilla*, but small if compared with the *Congri*. The distance between the eyes equals the distance between the orbit and end of the snout, and is contained four times in the distance between the end of the snout and the gill-opening. The length of the gape is contained thrice and one half in the last-mentioned distance.

Vomerine and nasal teeth in one cluster, without any perceptible line of separation, forming a brush-like plate, which tapers to a point on the roof of the mouth, and does not extend so far back by one quarter as the palatines. The individual teeth are short, slender, cylindrical and slightly recurved, with small, compressed, acute tips. The palatine bones are armed with a main series of teeth, resembling those of the common conger in being chisel-shaped and somewhat oblique at the tips, and, from their uniform height and close arrangement, fitting the series for an incisorial function. On the inside of this row there is a lower even range of more pointed teeth, whose tips are inclined inwards towards the mesial line. A deep smooth furrow separates the two rows. On the outside, close to the root of the main palatine series, there is a row of shorter acute teeth, resembling the nasal ones. Anteriorly these acute teeth increase in number to three or four deep on the outside, and also fill up the furrow between the principal rows, which there becomes wider, so that the fore end of the palatine bones presents a dental surface altogether similar to that of the nasal and vomerine bones; and the ends of the palatines, instead of articulating to the posterior edge of the nasal disk, as in most of the congers, go forward to the end of the snout, flanking the nasal bone, on which they have a slight lateral motion, so that the line separating their dental surfaces can be traced. The mandibular teeth are like the palatine ones, and there are about nine teeth in the width of the dental surface near the symphysis.

The gill-openings are rather large, and the pectorals small and rounded. Their length about equals the distance from the posterior edge of the orbit to the end of the snout; and the dorsal commences at the distance of thrice the length of the pectoral from the gill-opening.

Length 36 inches. To anus  $16\frac{1}{2}$  inches. To gill-opening 4.8 inches. Height of body behind the pectorals 3 inches. Thickness 2 inches.

In *Anguilla brevirostris* the anterior interior palatine teeth are represented as forming an obtuse cluster on the side of the vomerine teeth. The dental plate, though wide anteriorly in *labrosa*, does not form the same lobe-like cluster, and the vomerine teeth taper more regularly and rapidly to an acute point.

#### PLATYCEPHALUS CIRRONASUS. Richardson.

RADI:—B. 7; D. 9|—12; A. 11; C.  $9\frac{1}{4}$ ; P. 20; V. 1|5.

Plate 11., figs. 7—10.

The body of this *Platycephalus* is thickest where it joins the head. At that place its width exceeds its height by a fourth or fifth part, and its back rounds imperceptibly down to the belly, which is flat. It tapers gradually from the shoulders to the base of the caudal fin. The head, when the upper jaw is retracted, forms just one-third of the total length of the fish, and its breadth at the gill-covers exceeds its height by a third part. Viewed from above its outline is semi-elliptical, the snout being rounded. In profile the snout is almost horizontal, with an abrupt rise from the nostrils, produced by the prominence of the orbits, and a more gentle ascent from the eyes to the dorsal. The under jaw is the width of its lip longer than the upper one, but the latter can be protracted so as to equal the mandible. The anterior nostril is furnished with a pointed thin membranous barbel, and the posterior one has a lower semi-tubular margin. The eyes are oval, approaching to round, being only slightly longer than they are high. In figure 7 they have a more oblong shape, from their upper parts being seen in perspective. Their diameter is contained about five times and a half in the length of the head, and the distance between their orbits is equal to half a diameter. The superior margins of the orbits are thin, elevated and acute, producing a semicircular canal between the eyes. In the fore part of this canal, before the orbits, there is a very slight obtuse mesial ridge, which entirely disappears between the eyes. There is no vestige of an orbital barbel such as exists in *P. tentaculatus* of Rüppell, from which this species also differs in its shorter and more depressed snout and larger eye. The following are the spines with which the head is armed. The prefrontal shows a small blunt point, covered with integument on the outside of the posterior nostril. There is one acute spinous point at the anterior end of the orbital border, and two posteriorly, the last one being wholly behind the orbit, and rather exterior to the one which precedes it; a low ridge leading from the last orbital spine, inclining slightly to the mesial line, and, augmenting in height as it runs back, ends in an acute point on the hinder part of the cranium. On the temples there is a small acute spine immediately behind the orbit, and a short acute ridge which springs from its base, and inclines a little outwards,

terminates in another. The supra-scapular furnishes one small acute spine, and the superior bone of the humeral chain forms an elevated thin ridge at the upper border of the gill-opening, which ends posteriorly in a pungent angle.

Immediately posterior to this, at the commencement of the lateral line, there are two moveable pungent points, like spinous scales, being the only armature perceptible on the line. The upper extremity of the maxillary forms a small bluntish point at the end of the snout on each side, but the preorbital appears to be wholly without any angular points that are perceptible through the integuments. The second suborbital is traversed by a thin, prominent, perfectly smooth ridge, which abuts against the base of the upper preopercular spine. In the figure, the under edge of the disk of the suborbital is also shown, but this becomes visible only when the integuments are allowed to shrivel by drying, and is not prominent. The preoperculum has three small spines, of which the upper one projects farthest back, and the lowest one is minute, but none of them are readily found in the thick integument unless sought for. In the presence of these spines the species resembles *P. pristiger* of Quoy and Gaimard, but none of the bony ridges of the head are rough, either to touch or sight; neither can any angular points be detected on the inter-operculum. The operculum is armed by two small spines, the upper one, which is the most posterior, terminating the upper edge of the bone. The flexible cartilaginous point of the suboperculum projects far beyond them, and is bordered by a thin membrane above, which restricts the gill-opening there, and by the gill-membrane beneath. The head is mostly covered with a spongy integument, like that which prevails among the *Scorpenæ*, and the same kind of covering envelopes the scales of the back and sides, being the part on which the brilliant colours of the fish depend. None of the streaks or sculptures on the cranium, which exist in some *Platycephali*, are to be seen in this species.

The teeth, disposed in smooth shaven villiform bands, arm the premaxillaries, mandible and palatines. The bands are broadest on the premaxillaries, and very narrow on the palatines. There are also two small oval patches on the prominent chevron of the vomer, separated from each other by a deep smooth mesial furrow. The wide, thin, semi-cartilaginous, truncated tongue is smooth.

The lateral line, which runs parallel to the back, on a level with the upper part of the gill-opening, is traced on fifty-eight scales, and is keeled particularly posteriorly, but not strongly even there. One of these scales, with its short tubes diverging laterally from the central one, is represented at figure 9; and an ordinary scale, with its ptenoid disk, at figure 10. They are all clothed with thick integument.

The first dorsal spine stands above the posterior lobe of the gill-cover, and behind the attachment of the pectoral; the third dorsal spine is opposite to the base of the ventrals; and the last spine is so closely tied down to the back as not to be very obvious. It requires to be forcibly raised to be seen as represented in figure 7. There are no spines in the second dorsal or anal.

The patterns of colour which are to be traced on the

specimen after long maceration in spirits will be best understood by consulting the figure. Most of the shaded parts on the head, body and fins are aurora-red; the cross bars on the lips, however, some spots on the maxillary, others immediately beneath the eye, a few minute specks on the top and sides of the head, a large patch on the gill-membrane including the upper two rays, and the border of the first dorsal, are brown. Some spots on the upper plate of the coracoid bone, others in the axilla of the pectorals and ventrals, and a series of round ones at the bases of the rays of the first and second dorsal, are brownish-black. A large saddle-shaped patch, which descends from the whole length of the first dorsal well down the sides, is red, mixed and outlined with black. The bars on the tail have also some dark or blackish shadings. The ground colour is generally gray. The transverse lines on the caudal, ventrals and pectorals, and the oblique ones on the two dorsals and anal, are aurora-red.

Length  $9\frac{1}{2}$  inches. Length of head 3 inches. Length from end of snout to anus 4.6 inches. Height at shoulder 1.2 inch.

HAB. Botany Bay.

PSAMMOPERCA. Richardson.

This name has been devised to express one of the characters by which an Australian fish may be distinguished from the other PERCIDE, namely, the granular form of its teeth; the term being compounded of *ψαμμιδής*, *arenatus* and *πείρα*. The depth of the notch between the spinous and jointed portions of the dorsal fin induces us to compare this fish with the "Perches prorement dites" of the "Histoire des Poissons," but it differs from *Perca* not only in its dentition, but also in the want of a well-marked preopercular disk, in the dorsals being rather more connected, and in general aspect; from *Lates* in the absence of large angular teeth on the lower limb of the preoperculum, and in the perfectly entire preorbital; from *Perca-labrax* in its smooth tongue and its solitary opercular spine; and from the other described forms of this group by still more obvious characters. Among the Percoids with a single dorsal, *Centropristes* is the only genus with which it assimilates; and indeed it has an equal claim to be placed in the genus with *Centropristes scorpenoides*, which has a preoperculum armed beneath with recurved spinous teeth, and in that respect differs from the rest of the group as much as *Plectropoma* does from *Serranus*. It has been already remarked, in pages 27 and 30, that the admission of these anomalous species among the *Centropristes* makes the group unnatural, and it would be better to separate both them and the Australian *Centropristes*—*truttaceus*, *salar*, *georgianus*, &c.—which have the even dorsals and general habit of a *Cesio* or *Snaris*,\* from the typical members of the genus. On this account, therefore, and in accordance with the present practice of ichthyologists, we

\* Vide Hist des Poiss. iii. p.

keep *Psammoperca* distinct, without venturing to decide whether the group ought to be considered as of generic value, or, as Cuvier has done in similar cases, merely as a minor division. The blunt granular form of the minute teeth, the form and structure of the preoperculum, the sealiness of its imperfect inferior disk, and the deep notch of its dorsal, are its most obvious external differences from *Centropomus*.

The following is a summary of the principal characters of *Psammoperca*.

*Piscis acanthopterygius e familiâ Percidarum.*

*Dentes premaxillarum, mandibulæ, vomeris, ossiumque palati minuti, rotundati, numerosissimi, conferti: canini nulli.*

*Os preorbitale integerrimum, simul ac nasus et mandibula porosum, squamisque carens. Maxillæ partim squamis minutis tectæ. Genæ operculaque prorsus squamose.*

*Preoperculum disco inferiori arcto squamis exiguis teneris tecto, margineque integerrimo munitum; anguloque ejus in spinam acutam decurrenti: limboque erecto acutè pectinato-dentato. Operculum spinâ gracili, solitariâ armatum, lobo membranaceo desinens.*

*Anus medianus.*

*Squamæ plenoideæ, basi flabellatim sulcatæ. Linea lateralis anticè arcuata.*

*Corpus compressum, a latere ellipticum.*

*Os humile, terminale.*

*Membrana brachioistega radiis septem sustentata.*

*Pinna dorsî profundè emarginata, spinis validis, æque ac pinna ani in thecâ squamosâ movens. Pinnae ventris sub-axillas pinnarum pectoris posita; squamis longis, compositis extra interque fulta. Pinna caudæ valdè rotundata. Membrane omnium pinnarum squamis teneris arcuè appressis obrelatæ; præter membranam spinas dorsî interpositam in quâ squamæ ordinatæ juxta spinas tantum adsunt.*

*PSAMMOPERCA DATNIOIDES. Richardson.*

*RADI:—B. 7; D. 8|12; A. 3|9; C. 15½; P. 15; V. 1|5.*

Plate LVII, figs. 1, 2.

Body compressed, profile elliptical, its height about the middle rather exceeding a fourth of the length of the entire fish. The length of the head is more exactly a quarter of the total length. Orifice of the mouth rather small, low and terminal. The profile rises evenly, and with a slight convexity, at an angle of 37° from the tip of the snout to the beginning of the dorsal, which is at the first third of the whole length of the fish; and gradually joins the arch of the back, whose summit is towards the end of the spinous dorsal, or a very little before the middle of the fish, caudal included. The curve of the belly is much

more flat anteriorly, but posterior to the anus the ascent to the trunk of the tail is equal to the descent of the back. Height of the tail between the three vertical fins contained twice and one half in the greatest height of the body. Orbit placed near the profile, oval and rather large, its greater axis being equal in length to one-fourth part of the length of the head. Forehead between the orbits flat, not equal in width to the vertical diameter of the eye. Nostils, two round openings on each side, in a smooth membrane, which reaches from the orbit to the end of the snout, the posterior and larger opening being close to the eye, and the anterior one near the fore corner of the preorbitar. Mouth rather small, cleft horizontally to beneath the fore part of the eye. Premaxillaries slightly protractile. Maxillary stoutish, dilating gradually towards the lower end, which is truncated, passes the corner of the mouth, and moves over the limb of the lower jaw: it does not glide under the preorbitar, and its posterior corner is clothed with minute scales. Even flattish bands of minute roundish or granular teeth arm the jaws, vomer, and edges of the palate bones. The dental band of the inter-maxillaries is broadest, and a little convex, and the more exterior teeth are a little larger than the interior ones. On the under jaw the band is much narrower, while on the small three-cornered chevron of the vomer, and the edges of the palate bones, the teeth are still more minute, but have the same granular form. Roof of the mouth plaited posteriorly.

Preorbitar meniscoid, with a slightly convex entire edge; its disk is widest under the posterior nostril. Rest of the suborbitar chain very narrow. The scaly integument terminates in a convex line between the eyes; the snout, whole of the suborbitar chain and lower jaw being covered by porous skin. The cheek and gill-pieces are wholly scaly. Between the curve of the preoperculum and the eye there are about eight rows of scales, and also several rows on the inter-operculum, which graduate into smaller scales on the adjoining bases of the gill-rays. The scales of the operculum almost equal those of the body in size. Small tender scales cover the lower limb of the preoperculum, a very narrow line of membrane showing obscurely beneath them. When the integument is removed, the under limb of this bone is seen to be composed of two thin, even, edges of bone, with a deep furrow between, and some pits in the bottom of the furrow. The upper limb of the bone is strongly and acutely toothed in a very regular pectinate manner, the teeth decreasing gradually in size as they recede both ways from the middle of the series. The angle of the bone is prolonged into a short, flat, spinous point, between which and the lowest tooth of the upper limb there is a small rounded notch filled with membrane. A solitary, slender, subulate spine projects from among the scales of the upper part of the operculum, the lobular tip of the gill-cover and the narrow edge of the suboperculum being membranous. Gill-opening pretty large, cleft forward to beneath the middle of the eye. Gill-membrane narrow, sustained by seven moderately long curved rays. Disk of supra-scapular covered by small scales, its border



being a line of porous integument, except at the crenated posterior bony tip. A scaleless temporal furrow runs from the eye to the upper angle of the gill-opening. Supra-axillary plate of the coracoid bone bicuspidate. Lateral line arched, and traced on about fifty scales, exclusive of small ones on the base of the caudal, the line being continued past the middle of the fin; and there are about fifteen or sixteen scales in the height of the body, seven of them being above the lateral line.

Pectorals small. Ventrals attached rather behind the pectoral axilla, and beneath the first dorsal spine. Third dorsal spine rather the tallest, but scarcely exceeding the fourth. The eighth spine nearly equals the seventh, but is only about one-third of the length of the longest spine, or of the soft rays.\* Anal more rounded than the soft dorsal, and embraced like it at the base by a scaly sheath. The anal spines are short and rather stout, the second being the thickest, and nearly as long as the third. Caudal much rounded. A tapering row of scales is applied to the front of each dorsal spine on alternate sides of the membrane. The rest of the fin-membranes are covered with appressed, tender, tiled scales. A tapering, tiled, compound scale flanks the outside of each pectoral, and there is a broader, loose, scaly-pointed plate between these fins.

Length of the specimen 9 inches; of the head 2·4 inches. Height of the body 2·38 inches. Diameters of the orbit 5·8 and 4·5 inches. Width between the eyes 0·4 inch.

Figure 1, Plate LVII., is a view of a dried section of the fish preserved in the British Museum. Figure 2 is a scale from the middle of the lateral line.

HAB. Australia.

#### PLECTROPOMA DENTEX. Cuv. et Val.

RADI:—B. 7; D. 10|18; A. 3|8; C. 17; P. 15; V. 1|5.

*Plectropoma dentex*, C. et V. ii. p. 394; Quoy, et Gaim. Voy de l'Astrol. p. 660, Pl. 4, f. 2; Neill's Australian Fish, MSS. Br. Mus., No. 23, Pl. 23. Specimen in British Museum numbered 46, 1, 31, 71.

#### Plate LVII., figs. 3—5.

This fish is stated by Assistant-Commissary-General Neill to be good eating, but not a common species in Western Australia. It is caught with a hook, and if the fisherman be not on his guard it is apt to use its remarkably strong canine teeth very effectively, and to bite him severely. It derives its native name, 'Taang' or 'Taa,' from these teeth, but the sealers name it 'the perch.' Though the species has been already figured, I have thought it advisable to give another representation of it, executed from a dried specimen in a very good condition.

Under jaw and maxillary minutely scaly. Preoperculum curved in an arc rather greater than a third of a circle,

without an angle. Its disk narrow, its upper limb minutely toothed; lower one irregularly crenated, with the anterior toothlet near the articulation of the lower jaw turned forwards. Three flat opercular spines, the middle one farther back and larger. Second anal spine stouter, and as long as the third one.

One strong and long canine tooth is implanted into each intermaxillary not far from the symphysis (vide fig. 4), and on the limb of the bone there is an exterior row of short subulate teeth, with a narrow irregular band of minute villiform teeth at their bases within. The dental band at the symphysis is broader and coarser, resembling the dentition of a *Serranus*. Five tall and very strong canine teeth arm each limb of the lower jaw, the anterior tooth and the two posterior ones being larger than the intermediate ones. The villiform teeth occupy less space at the symphysis than in the upper jaw, and on the sides of the bone they are reduced almost to a single series, but behind the last canine they again increase to two or three rows. Chevron of the vomer acute. The villiform teeth which arm it, and the very narrow bands on the palatine bones, are finer than those on the jaws.

The original colours cannot be described from the dried specimen, but the forms of the markings seem to be very perfectly preserved. Along the back there remains a double row of dark or blackish cloud-like spots, mixed with oval and roundish white ones, which exist also on the sides and belly, and are there larger. There are also on the back and upper half of the sides three or four rows of narrow longish spots, which have still a bluish colour. The spinous dorsal and scaly base of the soft part of the fin are marked like the back. On the head the three kinds of markings also exist, but the spots are smaller much more crowded, and the black spots extend to both jaws and the whole side of the head. A few black spots exist on the basal half of the pectoral and base of the caudal. The articulated portions of the vertical fins are rather broadly bordered with black, the anal, especially one half of it, being of that tint. The tip of the ventral is also black.

Length of fish 17·25 inches. Length of head 4·8 inches.

HAB. King George's Sound.

#### CENTROPRISTES GEORGIANUS. Cuv. et Val.

*Centropristes georgianus*, Cuv. et Val. vii. p. 451.

*Arripis georgianus*, Jenyns, Zool. Beagle, p. 14.

RADI:—B. 7; D. 9|16, interdum 14; A. 3|10, vel 11;  
C. 17½; P. 15; V. 1|5.

#### Plate LIV., figs. 3—6.

Full descriptions of this fish are contained in the *Histoire des Poissons*, and in the Rev. L. Jenyns's account of the Ichthyology of the Voyage of the Beagle. Its resemblance to the *C. salar*, noticed above at p. 29, and described in the third volume of the Zoological Transactions, and

\* There is no recumbent spine in front of the dorsal.

figured on Plate XX., is very great. It is, however, rather more compressed, and the scales are somewhat smaller, the snout shorter, the eye large, so as exactly to equal the breadth of the flat forehead between the edges of the orbits, and the anal has a much slighter curve or notch. The row of scales on the maxillary, being very deciduous, has fallen from the specimens, and was omitted by the artist in his drawing, but traces of it exist on the fish. There are fifty-four scales, with tubes on the lateral line, and five or six rows on the base of the caudal, making about sixty in all between the gill-opening and caudal.

Length  $5\frac{1}{2}$  inches.

HAB. The south-eastern and south-western coasts of Australia. Norfolk Island. Port Jackson. King George's Sound.

GRYSTES MACQUARIENSIS. Cuvier.

*Grystes macquariensis*, Cuv. et Val. Hist. des Poissons, iii. p. 58.

RADI:—B. 7; D. 10|15, vel 11|16; A. 3|13; C.  $18\frac{1}{2}$ ; P. 17, vel 19; V. 1|5.

Plate LIII., figs. 8, 9.

In Mitchell's Expeditions in Australia, Pl. 6, f. 1 represents a fish locally named 'cod perch,' and to which the author has given the specific name of *Grystes peelii*, because it varies in some respects from the description of *G. macquariensis* in the *Histoire des Poissons*, and does not correspond with Guerin's figure in the *Iconographie de Regne Animal*. Our specimens have the pale margins to the dorsal and anal, which exist in *macquariensis*, but which *peelii* is said to want. Their form, however, is that of Mitchell's fish, and as they agree sufficiently with the detailed description in the *Histoire des Poissons*, the probability seems to be that *macquariensis* and *peelii* are but one species, and that Guerin's figure, as in many other instances, has been carelessly drawn. The account of *macquariensis* in the *Histoire des Poissons* is sufficiently detailed; and we shall merely add, that the scales are small, deeply imbedded in a mucous skin, and cover almost every part of the surface of the fish: they exist on the pectorals, ventrals, caudal and first dorsal, and entirely clothe the second dorsal and anal. They are found, though minute, even on the membrane joining the limbs of the lower jaw; also on the gill-rays, snout, preorbital, maxillary, disk of the preoperculum, as well as on the gill-plates and rest of the head.

Mitchell describes the colour of *peelii* as being "light yellow, covered with small, irregular, dusky spots, which get more confluent towards the back. The throat is pinkish, and the belly white." The original tints of our specimens have been altered.

Length from 6 inches to 18 inches.

HAB. The Macquarie, and several other Australian rivers.

DATNIA ELLIPTICA. Richardson.

RADI:—B. 6; D. 12|13; A. 3|8; C.  $15\frac{1}{2}$ ; P. 15; V. 1|5.

Plate LII., figs. 4—8.

At page 24, and in Plate XVIII., fig. 3, I have described and figured a fresh-water fish which differs from the group of *Therapon*, *Datnia*, *Pelates* and *Helotes*, in having an undivided air-bladder, and from each of these genera in some other peculiarity of structure. On the whole it agrees best with *Datnia*. In Plate LII. we have given a representation of another fresh-water species very similar to *D. caudavittata* of Plate XVIII., but differing from it in its more oblong form, its less elevated cheek and broader operculum, which is covered by nine rows of scales. Its teeth are villiform on both jaws, the outer row being a little stronger, but still small. The teeth stand at the symphysis about six or seven deep. There are none on the vomer or palate bones. The preorbitals are finely striated in correspondence with minute marginal crenatures. The preoperculum is strongly serrated at its rounded corner, and becomes gradually less so towards the extremities of both its limbs; and the small, flat, opercular spines are grooved at their tips so as to appear double. The humeral bone and supra-axillary plate of the coracoid are furrowed and crenated like the preorbitals.

Length  $6\frac{1}{2}$  inches.

HAB. Rivers in Western Australia.

LETHRINUS CHRYSOSTOMUS. Richardson.

RADI:—B. 6; D. 10|8; A. 3|8; C.  $17\frac{1}{2}$ ; P. 11; V. 1|5.

Nearly fifty species of *Lethrinus* are described in the *Histoire des Poissons*, but as they are not characterised by any well-marked peculiarities of structure, description fails to convey such an idea of each species as will render it easily recognizable. The comparative notices in that excellent work are chiefly of use when the ichthyological student has a good series of specimens for his guide, but do not suffice for the determination of isolated examples, particularly when the colours of the fish have perished; and we have not access to more than seven or eight figures which may help in this process. The specimen described below was taken at Norfolk Island, and except as to colour, which has doubtless changed by immersion in spirits, is in excellent condition. In drawing up the description, I have been very particular as to the position of the eye, and the relative proportions of the parts of the head, especially in regard to the dimensions of the preorbitals, whose size greatly influences the physiognomy of the *Lethrini*. And I have also attended to the teeth, that the species may be the more easily identified when it is examined on the coasts of Australia.

The profile resembles that of *genivittatus* more nearly

than that of any of the figures given in the *Histoire des Poissons*, Rüppell's *Neue Wirbelthiere*, or by Russell, but it has a higher body, shorter dorsal spines, and its eye is placed proportionally farther from the end of the snout, being fully three longitudinal diameters of the orbit from the extremity of the upper jaw when closely retracted, and only one diameter from the nuchal scales. The *Lethrinus harak* of Rüppell has a shorter snout, a more concave profile of the face, and a more delicate and less strongly arched spinous dorsal.

Our fish has a profile ascending from the snout, with a scarcely perceptible concavity, to the lower nostril, and then straightly, or rather convexly, to the nape, where it passes without abruptness into the longitudinal curve of the back. The face makes an angle of  $45^\circ$  with the horizontal rictus of the mouth; the back is moderately convex, and the belly less so; the throat and under surface of the mandible having a slight ascent when the mouth is closed. The head is considerably compressed, its thickness at the orbits being rather less than one-third of its height there, and at the nape, which is a little thicker, the proportion to the height is nearly the same. The top of the head and snout is rounded off; the sides of the head are flat and vertical. The distance from the anterior edge of the preorbital lip to the first dorsal spine is exactly equal to one-third the length of the fish, caudal included, and the long diameter of the eye forms one-fifth of this same distance, and also of the length of the head, measured from the front of the internaxillary lip to the apex of the gill-cover. Again, the long diameter of the eye is contained thrice in the height of the cheek between the orbit and inferior edge of the interoperculum, and the height of the head at the nuchal scales is equal to the distance from these scales to the internaxillary lip with retracted jaws, but is less than the length of the head measured to the hinder edge of the gill-flap. The whole head, except the operculum, is covered with thick porous skin, which projects beyond the edges of the opercular pieces, forming acute, but very smooth, flaps. The preoperculum is free, or capable of being raised round its whole posterior and under border, no part of the bone appearing through the integument; and the depth of the flap at its rounded corner is about a quarter of an inch. The nearly vertical posterior edge is slightly concave. The integument is continued evenly over the disk of the bone, the cheek, preorbital, and across the snout, its inferior edge forming the preorbital lip, whose flap is a quarter of an inch deep: its edge is quite even. The height of the interoperculum is likewise increased by an even and rather firm cutaneous border. The operculum is covered on the disk with six rows of scales, and behind the last row the rounded, thin, flat edge of the bone appears covered with smooth skin. The flexible cartilaginous point of the interoperculum underlies this bony process, and the soft skiny border of the gill-flap forms a rounded corner or lobe behind all. There are no points such as exist on the bony operculum of *genivittatus*, *lutjanus*, and some others.

The mandible is articulated under the posterior nostril, and when the mouth is fully open it is depressed so as to form an angle of about  $100^\circ$  with the throat, the premax-

illaries being at the same time protruded about half an inch. In this state the flat, broadly rounded, lower end of the maxillary, enveloped in folds of skin, comes from under the preorbital, which wholly conceals it when the mouth is closed. The lips are densely studded with small, soft, smooth, roundish papillae, and towards the roots of the teeth are lined with folds of soft fringe-like villi. The jaws, when the mouth is closed, are of equal length, and each armed at the extremity by four canine teeth, that is, two on each premaxillary and limb of the mandible: they are of moderate size, and the intermediate pair is smaller than the outer ones, particularly on the mandibles; but they are followed on the limbs of the upper jaw, and about a tooth's breadth more interiorly, by a row of ten or eleven smaller, stoutly subulate teeth, which increase slightly in size and become more conical from the first to the seventh: this one equals the middle pair of canines, and the last three lateral teeth are smaller, lower and more blunt, but not actually flat-crowned. Behind the canines there is a band of densely villiform teeth, which tapers off on the sides of the jaw, and ends at the seventh lateral tooth. The limbs of the lower jaw are armed by twelve teeth similar to the premaxillary ones, but a little larger: they augment in size from the first to the ninth, and the last three are lower and blunter. The tongue is narrow, pointed and smooth.

The supra-scapulars are each covered by a cluster of six scales, whose disks are clothed with porous skin; and a row of five or six similar scales descends on the temples before the upper end of the preoperculum. The nuchal or first row of scales are also invested with porous integument, and the first bone of the humeral chain takes its place among them, being distinguishable chiefly by its somewhat greater size. There are forty-six scales in a row between the gill-opening and the caudal fin, excluding the band of small ones which invest the bases of the rays, and about eighteen rows on the height behind the axilla of the pectoral. The species is one of the highest and stoutest among the *Lethrini*, the height of the body being equal to the length of the head or one-third of the total length of the fish, agreeing in this respect with *abbreviatus* and some others described in the *Histoire des Poissons*. The first dorsal spine stands over the space between the gill-opening and base of the pectoral, and is a trifle too far forwards in our figure.\* It is scarcely half the height of the third spine, which is the tallest: the following ones gradually decrease to the eighth, which is about one-fourth shorter than the third one, and is very slightly exceeded in height by the ninth and tenth. The soft rays are about equal in length to the third spine. The spines of the dorsal and anal are set with their broad sides turned alternately to the right and left. The third anal spine is the tallest. The pointed scales above and between the ventrals are three-cornered, and possess considerable rigidity. The caudal when extended is notched to about a third of the length of its middle rays, and its corners are rather acute.

The colours in a fresh state were not recorded, but the

\* The artist has inadvertently represented eleven spines instead of ten, and this error has advanced the commencement of the fin a little.

dark parts in the plate have a deep brown hue in the specimen, which has been long in spirits; and the inside of the mouth is of a bright reddish-orange, which also tinges, though not so deeply, the corner of the mouth and the parts which are exposed by the protraction of the intermaxillaries.

Length of the specimen  $13\frac{1}{2}$  inches.

HAB. Norfolk Island.

CRENIDENS SIMPLEX. Richardson.

RADI:—B. 6? D. 15|12; A. 3|12; C. 15 $\frac{1}{2}$ ; P. 16; V. 1|5.

Only one member of this genus is described in the *Histoire des Poissons*, namely, the *Crenidens forskalii*, which has the cutting edge of each tooth divided by notches into five even cusps. Several other members of the group inhabit the seas of China and Australia. One of these, *C. punctata* (Richardson, Rep. of Br. Assoc. for 1845, p. 242; *Girella punctata*, Gray, Ill. Ind. Zool., Pl. 98, figs. 3, 4) has tricuspid teeth, as has also *C. triglyphus* (page 36 of the present work, and Plate XXV., fig. 2) and *C. melanichthys* (Temm. et Schl. Fann. Jap. p. 75, Pl. 39; Rep. Br. Assoc. p. 243). The teeth of *C. tephraeops* of King George's Sound, described above in page 69, and figured on Plate XLI., fig. 1, are also tricuspid; but the cusps, instead of being equal as in the preceding species, have the middle one considerably wider and longer than the side ones. *C. zebra* (p. 70 *supra*) and *C. leoninus* are described from drawings, and the forms of their teeth are unknown to me; but one species which, like *triglyphus*, is an inhabitant of Port Jackson, has all the external characters of the genus, except that the teeth are entire, and not in accordance therefore with the scientific appellation of the group. The following description was drawn up from a dried specimen, numbered 46, 10, 22, 11, in the British Museum.

The general form is not very dissimilar to that of *C. forskalii* or *triglyphus*, but the profile of the forehead is more sloping. The height of the body is contained thrice and one-third in the total length of the fish. The head forms a fifth part of the whole length. The diameter of the eye is equal to a quarter of the length of the head. Two small round nostrils are placed immediately before the eye on each side. The maxillary is slender, and lies in a deep furrow behind the premaxillaries, being hidden when they are retracted: the dilated end is visible behind the corner of the mouth, and glides under the edge of the preorbitar. The premaxillaries and lower jaw are armed with many rows of teeth, which have narrow bases, and dilate gradually towards their truncated, entire, cutting edges. The four outer rows on the edges of the jaws are slightly incurved, and in consequence of their position are separated by a gap from a dense cluster of much smaller, but otherwise similar teeth, covering the more interior surface of the jaws. In the recent fish these inner teeth, owing to their tips only being visible, may be mistaken for

granular teeth, but they have the same form with the larger outer ones, and are evidently destined to replace them when they are worn down, in the same manner that the inner teeth of a shark roll outwards on the edge of the jaw as they are needed. The four outer rows are obliquely tiled, the innermost of them being the highest. A circular plate on the vomer is rough with minute teeth, invisible to the naked eye; and there is a smaller plate of the same kind on the fore end of each palate bone, which is separated from the vomerine plate by a narrow interval. The tongue is porous, the isthmus smooth; the under pharyngeals are armed by short, subulate, recurved, densely crowded teeth. The branchial arches are each furnished by two rows of thin crests placed transversely, and bristly with minute hair-like teeth. Jaws, snout, preorbitar, narrow suborbitar chain, temples, disk of preoperculum, interoperculum, suboperculum and lower half of operculum, with the scapular, scaleless. Seven rows of scales cover the cheek between the curve of the preoperculum and the orbit, and there are about as many on the upper half of the operculum. Bony operculum widely notched; the upper corner of the notch greatly rounded off, the lower part of the curve much more sudden, and terminated by an acute corner, which is passed by the narrow tip of the suboperculum. The notch is filled in the recent fish by smooth membrane. The scales of the body have the same oblong form with those of the other species described in this work. A meniscoid segment of the exposed disk of each scale is traversed by rough radiating lines, which end in minute marginal teeth. The middle of the disk is smooth and shining, and more posteriorly the lines of structure are longitudinal and parallel. Fifty-five scales complete the lateral line, and there are about ten rows of scales above it, and twenty below, where the height of the body is greatest. The scales are smallest on the nape, breast and belly, and largest on the sides below the lateral line, and on the tail generally. A fillet of small scales runs along the base of the dorsal, and another along the anal. Small scales also cover the base of the caudal, and there are minute scales on the membranes of the soft dorsal and anal, with narrow tapering fillets running up behind the alternate spines, as in the *triglyphus*. Lateral line considerably above the middle of the height, following the curve of the back, and unbroken. Ventral spine slender, one-third shorter than the soft rays, and standing under the third dorsal spine and attachment of the lowest pectoral ray. In *triglyphus* and *tephraeops* the ventral spine is under the beginning of the dorsal. Dorsal spines rather slender, very acute, and about equal in height to the soft rays. Anal spines stouter, the third scarcely taller than the second, and about one-third longer than the first one, which stands under the last dorsal spine. Soft part of the fin higher than the dorsal and much rounded. Caudal moderately concave at the end.

Length of specimen 12 inches.

HAB. Port Jackson.



## SCORPIS GEORGIANUS. Cuv. et Val.

*Scorpis georgianus*, Cuv. et Val. viii. p. 503, Pl. 245.RADII:—"B. 7; D. 10/23; A. 3/25; C. 17; P. 15; V. 1/5."  
—*Histoire des Poissons*.

This fish is represented in Mr. Neill's drawings (No. 6), and is stated by him to be a very common inhabitant of rocky shores, and to take the hook readily. He says that it is a gross feeder, but is an agreeable article of food. It is the "striped sweep" of the sealers, the "pomfret" of the settlers of King George's Sound, and the "mudeur" of the Aborigines, who also name it "teutuck" or "karloch," from the shape of the fins. The drawing measures 12½ inches in length, and the body is 7½ inches high. The colour is blackish-brown, deepening to brownish-black on the snout, back, edges of the dorsal and anal, and on the whole of the other fins. There is a dark bar on the gill-cover and temples, another broad one descends from the whole length of the spinous dorsal to the belly, and two from the soft part of the dorsal. The lips, lower jaw and eye are yellowish.

I have seen no example of this species.

HAB. King George's Sound, Australia.

## SCORPIS ÆQUIPPINIS. Richardson.

"The Sweep," Neill's drawings of the Fish of King George's Sound (in Mus. Brit.), No. 43.

RADII:—D. 10/27; A. 3/26; C. 17½; P. 19; V. 1/5.

This fish is the "sweep" of the Sealers, the "memon" or "meemon" of the Aborigines of King George's Sound. It is very common on the rocky shores, and is stated by Mr. Neill to be a bold voracious fish, easily speared or taken by the hook. "The method employed by the natives for spearing the fish is extremely simple. They generally select a rock jutting far out into the sea, and sitting there on their hams, with a little stone before them, beat crabs to fragments and throw them into the water; then the fish, coming to seize upon the bait, is transfixed by the spear, which the native holds ready and poised in his hand. He rarely throws it without securing a prey on its barbed point." (Neill *l. c.*) This species is but a poor article of food.

This is a more oblong fish than *S. georgianus*, and the summits of its dorsal and anal are not falcate, or very slightly so, even in the largest individuals. The height of the body is contained nearly thrice in the total length, instead of only twice and a half as in *georgianus*. The length of the head is contained five times and a quarter in the whole length, and the diameter of the eye thrice and a half in the length of the head.

The premaxillary teeth are short, and disposed in dense villiform bands, the outer row being a little stronger and longer than the others, but apparently not so much so as in *georgianus*. The villiform bands cease about midway to the angle of the mouth, and the exterior row, gradually diminishing in the size of its teeth, disappears a little farther on. The mandibular teeth are similar, but reach to the corner of the mouth, the interior band thinning off to a point. The chevron of the vomer and edges of the palatine bones are armed with rather stronger villiform teeth. The teeth on the pterygoid bones are scarcely to be detected, even in the younger specimens, with a good lens. The preoperculum is finely and acutely toothed along its lower limb and round the angle, the teeth being visible to the naked eye, but on the edge of the limb there is merely a slight irregularity. The operculum is elliptically notched on its edge, without pungent angles. The cheek, suborbital chain, disk of the preoperculum, rest of the opercular pieces, lower jaw, gill-cover, throat, and most of the head, are scaly; the lips, membranous parts about the mouth and nostrils, and the maxillary, being smooth. The spinous parts of the dorsal and anal have scaly sheaths at their bases; the rest of the vertical fins are covered with minute scales. The scales of the body seem to have a more convex free edge than those of *georgianus*: they are strongly toothed on the edge, and most of them have three or four raised lines near to the free edge and parallel to it.

The drawing is coloured neutral tint, fading to pale blue or bluish-gray on the lower parts, and deepening on the caudal, dorsal and edge of the anal almost to black. The top of the head and back are also blackish, and the membranes of the pectorals and ventrals. The lips and eye are yellow.

Length of the specimens from 4 to 10 inches; of Mr. Neill's drawing 16½ inches.

HAB. King George's Sound, Australia.

## ARGENTINA RETROPINNA. Richardson.

RADII:—B. 6; D. 11; A. 20; P. 11; V. 6.

Plate LII., figs. 1—3.

Form fusiform and compressed, so that the height, which is one-seventh of the length, is nearly twice the thickness. The sides are flatish, the back obtuse, and the belly also rounded, but with a low, acute, mesial cutaneous seam, which runs from the pectorals to the anal, and is most visible posterior to the ventrals. The profile ascends in an arc to the occiput, and from thence to the dorsal, which is far back, it is horizontal, with a slight convexity. The under profile nearly corresponds with the upper one, except that when the fish is full of roe, as in the specimen which is figured, the belly is rather more convex. The length of the head is one-fifth of the whole length of the fish. The scales are very delicate, of an obtusely oval form, the

outline undulating irregularly. The lines of structure correspond with the outline, and are remote from each other, being few in number. There are no diverging fan-like furrows. As they are very deciduous but few remain on any of the specimens, and the number of their rows cannot be stated. The lateral line, which has been omitted in figure 1, is straight, and rather above the mid-height.

On opening the belly of a specimen, laid upon its back, much roe became visible, and beneath it lay the remains of the liver covering the upper half of the stomach. The stomach, which is not black like that of *Argentina sphyraena*, and has an obtuse fundus, is divided more than half-way down into the œsophageal and pyloric branches. The pylorus, which is close to the diaphragm, is much contracted, and the intestine descends from it in a straight line to the anus, there being neither cæca nor convolutions. No air-bladder was discovered on inspection of three or four specimens, none of them in perfect condition. The abdomen and the inside of the gill-plates are lined with a bright silvery membrane sprinkled with black dots, which are raised above the surface as if they were formed by drops of some thick pigment. A stripe along the spine, within the abdomen, which appears when the intestines are removed, is honey-yellow with black dots. The intestines contained fragments of minute marine Crustacea, and there were many small parasitical worms. The pectorals are attached near the ventral surface, and below the level of the eye. They are supported by eleven rays, of which the upper one is longest. The ventrals are attached about a tenth of the whole length before the middle of the fish, caudal included. The fore part of the dorsal is about as much behind the middle. The anal commences immediately behind the anus, and under the middle of the dorsal, ending opposite to the adipose fin. It is slightly excavated on its margin. Its front ray, like that of the dorsal, is short, and incumbent on the second one. The caudal is considerably forked, and is supported by eighteen rays, which are divided into two equal groups by a well-marked mesial membranous line. The outer ray, above and below, is unbranched, and broader than the others, which are forked. The end of the tail is embraced, for a little space, by thirteen short and successively decreasing rays above, and as many below. The rays of all the fins are jointed.

The length of the head is comprised five times and one half in the total length. The lower jaw is conspicuously longer than the upper one, and, when the jaws are closed, ascends considerably, with the gape of the mouth, which reaches nearly to the eye, but from the great shortness of the snout is small. The general aspect of the head and of the fish generally, irrespective of the backward position of the dorsal, is that of a young trout. The top of the head and snout are smooth and rounded, but the snout is not obtuse. The eye is large, touching the profile, but scarcely rising above it, one diameter and a half distant from the gill-opening, and less than a diameter from the end of the snout. Nostrils two contiguous round openings, with raised margins, placed nearer the end of the snout than to the orbit. Preorbital and rest of suborbital very narrow. Cheek nacy, but soft, and not naked or bony as in *Hydrocyon*. Preoperculum with a narrow nacy disk,

and the two limbs meeting in the rectangular corner. Gill-cover shaped as in *Salmo*, nacy; the suboperculum horizontal, and not having more than the fifth of the height of the operculum. Gill-opening amply cleft, the membranes uniting to the narrow isthmus opposite to the hinder part of the eye. Membranes narrow, supported by six flat, thin rays, which become gradually narrower towards their connection with the hyoid bone. The premaxillaries form one half of the upper border of the mouth, and are armed with fourteen or sixteen setaceous teeth in a single row. They are moderately curved, corresponding with the arc of the upper lip, and have no pedicle, but merely an increase of width to their mesial halves. The maxillary is narrowly dolabriform, the posterior and thicker border being straight. Its wider end plays over the limb of the lower jaw, while the middle part of its fore edge, for more than one-third of its length, completes the upper margin of the mouth, and is armed with about fifteen teeth like the premaxillary ones. Mandibular teeth similar and uniserial. The vomerine teeth are rather larger, and the palatine ones slightly smaller. Both sets are uniserial, but they are slightly moveable, and, being inclined alternately to right and left, they appear to be biserial, except in the skeleton, when the palatine is seen to be a very narrow bone, and the teeth strictly uniserial. The vomerine teeth, about six in number, are ranged transversely, close to the premaxillaries and parallel to them. The entopterygoid, which forms the floor of the orbit, is armed with three crowded rows of short subulate teeth, the interior row projecting conspicuously from the roof of the mouth. The soft parts adjoining these teeth and the palatines are studded with minute papillæ, looking like additional rows of teeth. The tongue is armed by two rows of curved teeth stronger than any of the others, and the isthmus of the branchial arches is covered with a crowd of minute ones. The upper pharyngeals are small cushions studded with microscopical teeth. There are four branchial arches, furnished with two rows of rakers, the anterior row of each arch being long and subulate.

The original colours of the specimen must have been considerably altered by the decadence of most of the scales. In their present state the back has a honey-yellow hue, with many black dots, and a broad stripe on the sides is silvery.

Length from 2 to 3½ inches.

HAB. Bay of Islands, New Zealand.

The specimens were taken in a net.

GADOPSIS MARMORATUS. Richardson.

RADI:—B. 6; D. 10/25, vel 26; A. 3/19; P. 17; V. 1.

Plate LIN., figs. 6—11.

I have seen only a single dried skin of this fish, and cannot therefore venture to offer a full description of its generic peculiarities. It appears to belong to the Blennioid family, and to be a form hitherto undescribed.

The general shape of the body, its rather prominent belly, large head, obtuse snout, projecting conspicuously beyond the lower jaw; and its slender jugular ventrals give it a good deal the aspect of a codfish, whence its generic name. The body tapers gradually towards the tail, whose height between the three vertical fins is contained about twice and one half in the height of the fish at the shoulders. The head forms one quarter of the whole length, caudal fin included: it is obtuse on the crown and rounded on the sides, the height before the eyes scarcely exceeding its width, but augmenting in proportion posteriorly, where the compression increases. The profile rises from the obtuse end of the snout, with a very gentle convexity to the commencement of the dorsal; and the curve of the opposing ventral surface is similar to the upper profile. The eye, placed laterally and near the profile, is of moderate size, and a little nearer to the end of the snout than to the gill-opening. The anterior nostrils, opening through short tubes, are on the sides of the snout near its end; the posterior ones are plain openings near the eye. The gape of the mouth reaches to the fore part of the eye. The preopercular does not show, but the hinder edge of the maxillary slips a short way under the fold of the scaly integument which covers it. The maxillary is slender, and dilates gradually towards its lower extremity, which is always exposed, and lies on the lower jaw behind the corner of the mouth. It is scaleless, like the lips and top of the snout back to the posterior nostrils. The slender premaxillaries, lengthened out by membrane, form the upper margin of the mouth, and are not at all protractile at the symphysis. The curved, unarmed preoperculum has a narrow disk covered with scaly integument, like the cheek and rest of the gill-cover. It is pierced by a row of conspicuous pores, which are continued forwards along the limb of the lower jaw. The triangular operculum ends in a flat, acute point, which does not rise through the integument, and is underlaid by the flexible lip and bordering membrane of the suboperculum. The interoperculum and gill-membrane are also scaly. Gill-opening large, the division of the membranes extending forwards to beneath the eye. The gill-membranes are supported by six rays.

The scales are all small, cycloid and oval, those taken from the body having generally about six furrows diverging from the centre like the sticks of a fan, and producing five crenatures or lobes on the margin. The scales extend to the fins, and all parts of the head, except the lips, maxillary and end of the snout. The lateral line runs near the back, following its curvature. The dorsal fin, commencing over the axilla of the pectoral, occupies most of the back, and has an even, horizontal outline, the greater length of the posterior rays compensating for the descending curve of the back. It is supported anteriorly by ten slender, but rigid and pungent spines, which are followed by simple, flexible and jointed rays. In the posterior part of the fin the soft rays split at their tips into two branches, which do not however separate. The anal commences a little before the middle of the fish by three slender spines, of which the third one is the tallest, and equals the soft rays in height: it ends a little before the end of the dorsal, leaving more of the tail naked, and its posterior rays are not quite so high

as the dorsal ones: neither of the fins have their posterior rays bound to the tail by membrane. The caudal is round, and embraces the obtuse end of the tail by short rays above and below. Pectoral rounded. The ventrals are jugular, and are attached beneath the preoperculum and well before the pectorals. Only a single jointed ray, with a forked tip, can be detected on each, and no spine; neither is there any spine in the pectoral.

The teeth are in fine narrow, card-like plates, on the premaxillaries, vomer, palatines and mandible, and are unequal in height: about six on each limb of each jaw, in the exterior row, appear so much taller than the others when examined through a lens, as almost to deserve the appellation of canines. The few teeth on the chevron of the vomer are taller than the crowded ones on the edge of the palate bones. The pharyngeal bones and all the viscera have been removed from the specimen.

Length of fish nearly 4 inches.

HAB. Rivers in the southern parts of Australia.

The colour of the dried skin is pale brown, marked on the dorsal and caudal fins, head, back and sides, with irregular spots of liver-brown. The spots on the tail assume somewhat of a banded arrangement. The anal is edged with dark brown.

HEMEROCETES ACANTHORHYNCHUS. Forster.  
(*Callionymus*).

*Callionymus acanthorhynchus*, J. R. Forster, MSS. ii. 30, apud Bl. Schn. p. 41. Idem, Descr. An. Licht. edit. p. 117. G. Forster, fig. pict. 2, t. 175 in Bibl. Banks.

*C. monoptygchia*, Bl. Schn. l. c.

*Hemerocetes acanthorhynchus*, Cuv. et Val. xii. p. 311. Richardson, App. to Diefenbach's New Zeal. p. 212.

RADI:—B. 7; D. 39 ad 41; A. 36, vel 37; C. 8½; P. 21; V. 1½.

Plate LIV., figs. 7—12.

In the zoological appendix to the narrative of Dr. Diefenbach's Travels in New Zealand, I described, at considerable length, a specimen of this fish, brought by that gentleman from Wangaroa Bay, in New Zealand. The figure in Plate LIV. was drawn from an individual obtained by Captain Sir Everard Home, Bart., in Cook's Straits; and a few particulars of the splanchnology and osteology are added from a third example, which was greatly decayed. The following description is a revised copy of the one mentioned above.

Form elongated, the height not exceeding one-thirteenth of the whole length: the width at the gill-covers, where it is greatest, exceeds the height. The outline of the depressed head slopes gradually to the end of the snout; the jaws when closed form the thin extremity of the head when seen in profile (fig. 7). Viewed from above (fig. 8) the head has a semi-lanceolate form: it is flatly convex, transversely, and the same depressed rounded form extends

backwards to the dorsal, with an acute, though not elevated, mesial, scaly ridge, extending from the fin to the occiput. At the beginning of the dorsal the body is round, and from thence it tapers gradually to the base of the caudal fin, the tail being slightly compressed. The muscles of the back and belly swell so as to place the dorsal and anal fins in grooves. The length of the head is comprised four times and three quarters in the total length, caudal included, and its height at the eyes is less than a third of its own length. The large oval orbits, being very near each other, have a vertical and outward aspect. Their margins are smooth and slightly raised above the narrow isthmus between them, and the full eyes swell above the line of the profile. The integument round the ball of the eye forms a loose fold, and I can detect no other appearance of the nictitating membrane mentioned by Forster. The preorbital, large and triangular, with its apex pointing forward, has a smooth, even edge, with some low smooth ridges radiating forward on its surface. The preorbital lip, stretching over the pedicles of the premaxillaries, is correctly described by Forster, "*C. labio summo semilunato, aurtorsum bispinoso*," the spiny tips of the crescent being the subulate shoulders of the maxillaries (figs. 8, 9). The maxillary comes into view when the jaws are fully extended, but when the mouth is closely shut it is retracted entirely under the preorbital and scaly edge of the cheek. The premaxillaries, with very slight development of lip, form the entire upper jaw, and play beneath the preorbital lip, descending when protruded, but not altering the horizontality of the gape. The mandible is rather more acute and a very little shorter: it is bordered by a thin membranous lip, which widens towards the corner of the mouth, and folds back when the jaws are closed. The gape extends back to the front of the orbit. The nostrils are situated a short way before the eye, close to the upper edge of the preorbital. Forster says, "*Nares inter oculos minime, orbiculares, contiguae*," but he evidently mistook for them a small cluster of pores (fig. 10). The preorbitals are bordered with pores, and there are clusters of others on the mandible and disk of the preoperculum (vide figs. 8, 9, 10). These parts, the gill-membrane, and the isthmus between the eye, are scaleless. Moderately large scales cover the entire cheek, except the very narrow suborbital chain: the operculum, suboperculum and interoperculum are also densely scaly. The bones of the gill-cover are thin, smooth and transparent. The operculum is triangular, and tapers posteriorly to a point, which shows like a minute spine among the scales, at the upper part of the gill-cover, close to the supra-scapulars. The suboperculum is considerably larger in all its dimensions, and has a smooth convex surface, with a tapering point, forming the apex of the gill-cover, and is not scaly like the rest of the gill-flap (fig. 9). The gill-opening is ample, running forward on each side of the nape, and also beneath, to the root of the tongue. The gill-membrane, which is tolerably large, is completely concealed when the jaws are closed by the approaching limbs of the mandible and scaly interoperculum. Its rays are long, slender and curved.

The teeth are short and setaceous. They stand in a band four or five deep on the premaxillaries and mandibular

bones; also in a small irregular tuft on each exterior corner of the end of the vomer, the mesial space being smooth. They are crowded on the pharyngeals, forming a hemispherical cluster on each upper bone, and a more flat dental surface on the lower ones. There are no teeth on the isthmus of the gills or on the tongue. The rakers of the branchial arches are sessile knobs. Within the mouth, before the vomer, there are two prominent knobs, which are each formed by a cushion of integument, covering a short tubular process of the maxillary which runs beneath the premaxillary pedicle.

The scales are moderately large, and of an irregular, semi-ovate form, most of them having an acute point in the middle of the free edge, and being cut transversely at the base by a waving line, which produces a very shallow middle lobe. There are from eighteen to twelve fan-like striae on the base, which do not produce crenations on the margin. The free edge is perfectly entire. The lines of structure are nearly obsolete on the disk, fine and transverse behind, and longitudinal in a triangular space on the sides, where they are also more evident. The scales of the lateral line (fig. 12), which is straight or with a slight descent in the humeral region, have a short mesial tube, and their free edges are lacinated: there are from forty-four to forty-eight scales on this line, the specimen figured having forty-four.

The pectorals are oval and rounded. The elliptical, acute pointed ventrals are attached before the ventrals under the superior angle of the gill-opening: their short slender spine has a flexible tip. The scaly space between them exceeds the width of one of their bases in breadth, and their tips when laid back touch the first anal ray. The dorsal, commencing nearly over the middle of the pectorals, and extending to within a short distance of the caudal fin, has an even outline; the posterior rays, however, becoming gradually somewhat shorter. The third or fourth ray stands over the anus. All the rays are jointed, tapering and flexible, except one or two of the middle ones, which are split at the tip, and the last, which is forked. The anal commences close to the anus, is not quite so high as the dorsal, and is also supported by jointed rays, the first one being unbranched, and the others unilaterally branched at their tips. The membrane of both fins is very delicate and readily torn, and was not complete in any of our specimens. The caudal is composed of eight forked rays, and four graduated unbranched ones above and three below. The rays being very brittle the fin is easily mutilated, and consequently some uncertainty exists as to its proper form. Forster drew it as being lunate at the end; Dr. Diessenbach as being truncated, with an elongation of the upper angle; and in our specimens it appears round, but is not perfect.

Forster describes the body as being coloured of a livid red; the dorsal as being marked with scattered red spots, and the other fins as reddish; the iris reddish and silvery. Dr. Diessenbach's sketch, which is unfinished, is coloured wax-yellow, with five oblique blue streaks on the cheek, and some blue streaks in blotches on the sides; purplish and red lines on the dorsal and edge of the anal; the rest of the latter fin, the pectorals and ventrals, being aurora-red.



The stomach is an oval sac, with the pyloric orifice of the intestine situated one-third of its height from the fundus. The gut is short, folding only once in its way to the anus, and there are no cæca. The supra-occipital has a thin crest behind, extending as far back as the corners of the par-occipitals, which project so as to produce an angular notch in the occiput. The top of the skull is smooth and flatly rounded. The large oval orbits are separated by a narrow bridge, which is concave, forming a furrow; and the margin of the orbit beneath is completed by the narrow, tubular, suborbital chain. The nearly quadrantal preorbital is traversed by several radiating flat elevations, which are hollow beneath. The preoperculum is curved to rather less than a right angle: its lower limb is somewhat longer than the upper one, and its edge is perfectly smooth. There are ten abdominal vertebrae and thirty-seven caudal ones: the pleurapophysial processes of the former are mere angles. The inferior processes in the caudal vertebrae are slender and subulate, like the neural spines, of all the column.

Length from 6 to 8 or 9 inches.

HAB. Coasts of New Zealand. Wangaroa Bay. Cook's Strait. Queen Charlotte Sound.

#### CHIRONECTES CAUDIMACULATUS. Rüppell.

*Chironectes caudimaculatus*, Rüppell, Neue Wirb. p. 141, Tab. 33, fig. 2.

RADI:—D. 1-1-1-13; A. 7; C. 9; P. 9; V. 5.

Plate LX., figs. 8, 9.

Notwithstanding some slight differences in form, as shown by the drawings, I have ventured to refer this fish to the *caudimaculatus* of Rüppell, on account of the close accordance of his description, and the general resemblance of his figure. The differences to which I allude are, the different positions of the first dorsal ray, which in our specimen is very near the upper lip, and decidedly before the eye, while in the *Neue Wirbelthiere* it is represented as over the orbit, and close to the base of the second ray. If this be not an error in the delineation of the Arabian fish, it may be considered as an indication of a specific distinction. The membranous filament was broken in the specimen Rüppell has figured, so that the form of that part in our figure is to be considered as the correct one. A slight difference of form is the greater height of the second and third dorsal rays in Rüppell's fish, but this I attribute to these parts being shrivelled in our example, which is a dried one. The anal and dorsal are connected by membrane close to the base of the caudal in the Australian fish, while there is a portion of the trunk of the tail free in the Arabian one; and the spots are represented as mere points, instead of the meandering and anastomosing

lines well exhibited in our figure. As there is great variety in the markings of individuals of the same species in this genus, I have not separated the Australian fish from *caudimaculatus*, on the latter account; and some of the other differences may be fairly attributed to the different condition of the individuals when sketched, as the laxity of the integuments in a fresh specimen admits of the form being varied, by their stretching in different directions. The distribution of the dark lines and other markings is different from that which characterises *C. hispidus* and other Indian species described in the *Histoire des Poissons*. *C. fuscipilis* has two spots on the fins.

In our example of *caudimaculatus*, the first free dorsal ray is slender, flexible, smooth, unjointed, and tipped with a thin bifid membrane. It springs from a small tubercle situated above the nostrils, and rough like the adjoining integuments. The second and third rays are covered with the prickly skin, which entirely conceals them, and forms of them two obtuse ridges or humps, rough like the adjoining parts of the back. The foremost of these humps is a little free at the top; the other is bound down to the back its whole length. The forms of the other fins will be easily understood from the figures. The skin is rough to the touch over the whole fish, and when examined closely appears to be equally studded with very small hemispherical eminences, which, along the lateral line, the space between it and the dorsal, on the top of the head, the snout, upper jaw, preoperculum, round the orbits and on the rays of the fins, each support a minute, rigid, bifid spine, very rarely a trifid one. Along the back, these minute spinules look like short hairs to the naked eye. Below the lateral line, only a very few spines can be detected, but the little eminences are many of them surmounted by a point of membrane. By dissection each eminence is found to be based on a thin circular scale, with an excentric umbo, from which a few wrinkles radiate; but there are no fan-like furrows, and the lines of structure cannot be made out with a simple lens of high power. The margin of the scale is quite entire. The lateral line runs, as described in the *Neue Wirbelthiere*, from the symphysis of the upper jaw, over the eye and along the back, in an undulating manner, to the middle of the dorsal, where it ends. Throughout its whole length it emits short vertical branches, which are most conspicuous on the face and scapular region, and it is also furnished with short filaments; a few membranous barbels are scattered over the sides, and one is appended to the chin or external projection between the limbs of the mandible, produced by the depression of the tongue. There is a prominence at the symphysis of the mandible, which is mentioned by Dr. Rüppell. The teeth on the jaws, vomer and upper and under pharyngeals are in card-like patches, the pharyngeals being best armed, and the vomer least so. The chevron of the latter is saddle-shaped, the mesial hollow being smooth, and the side eminences furnished with small patches of teeth. The eyed spots on the tail are transparent in the dried fish.

Length  $4\frac{1}{2}$  inches.

HAB. Coasts of Australia. Red Sea.

*LABRUS TETRICUS, vel TAUTOGA TETRICA.* Richardson.

*Labrus tetricus*, Richardson, Zool. Trans. iii. p. 136.

RADI:—B. 6; D. 9|11; A. 3|10; C. 14; P. 13; V. 1|5.

Plate LV., figs. 1—4.

In the Zoological Transactions, as above quoted, I described this species and three other *Labri* forming part of a collection of fish made at Port Arthur, Van Diemen's Land, by Assistant-Commissary-General Lempriere. Of these four fish I there remarked, that "they are all true *Labri*, and bear a general resemblance to the *L. bergylla* of the *Histoire des Poissons*, but the scales which clothe their opercula, though in fact much larger than in that species, being imbedded in a mucous skin, are scarcely discernible in the recent specimen. The opercular scales overlie the junction of the suboperculum, as in many European species, leaving however the greater part of the latter bone naked. There are no scales whatever on the interoperculum, in which respect these wrasses differ from *L. bergylla*, *mixtus*, *trimaculatus* and *turdus*. The scales of the cheek are small, and as their distribution varies they furnish us with a ready means of distinguishing the species from each other. In all the four, the teeth are longer and stronger at the symphyses of the jaws than in *L. bergylla* or *mixtus*; and the posterior ones being small, their diminution is more rapid, as in the genus *Julis*. They resemble *Tautoga* in possessing a pretty regular interior row of minute teeth. All have a canine tooth at the angle of the mouth directed forwards. The preorbital lips are not greatly developed, and do not conceal the swelling plaited ones of the upper jaw. The lower lip folds back in a rounded plait on each limb of the jaw. The maxillaries lie under the preorbitals, their lower ends coming out when the mouth is open. In the number of their fin rays they agree nearly with *L. pectiopleura* of New Zealand, and their dorsal fins have more soft rays than spines, in which respect they differ from the European wrasses."

*Labrus tetricus* has a short and rather bluff head, which is only one-fourth of the total length, caudal included. The height of the occiput equals the length of the head, and that of the tail between the three vertical fins is nearly one half of the height of the body at the pectorals. The greatest height of the body is contained three and four-fifths in the whole length, or less than four times. The head is clothed with a porous skin, which conceals the bones and scales in the recent fish; but as the integuments dry, the cranium, preorbital, margin of the orbit and preopercular disk, become prominent, rough and irregular. Four vertical rows of large thin scales, about half the size of the scales of the body, cover the operculum and two-thirds of the suboperculum: the large interoperculum, which is rendered wider by a membranous edge, and the broad disk of the preoperculum, which has also a thin membranous free border, are naked; with the exception of three rows of very small deeply-imbedded scales, which

descend from the temples, close to the inner edge of the preopercular disk, as far as its curve: the large cheek is also scaleless, but very porous. The preorbital, with its membranous border or lip, is but little inferior in width to the space between the orbit and upper angle of the gill-opening. The preorbital lips have a free edge at their union over the premaxillary pedicles. The premaxillary lips are thick, and plaited into seven or eight shallow folds, the inner fold being studded with minute wart-like papillae.

There are eleven teeth on each premaxillary bone, exclusive of a stout canine tooth standing forwards from the angle of the mouth, and implanted into the tip of the same bone. The mandibular teeth are also eleven in each limb; and on both jaws there is a single series of minute interior teeth, which are visible enough in the dried specimen, but can scarcely be detected in the recent one. Interior teeth of the same description exist in many of the European *Labri*, but they are seldom disposed in such regular rows; and as this inner dental series is one of the principal characters of *Tautoga*, the Australian Labroids here described ought perhaps to be referred to that genus. It is to be observed, however, that the species we shall have to notice have the gill-covers more extensively scaly than the *Tautoga* of the *Histoire des Poissons*, and differ from the European *Labri* chiefly in the interoperculum being naked. The teeth of *tetricus* are disposed in straight lines, so that when the open mouth is viewed in front they form a rectilinear rhomb, differing in this respect from *L. fucicola*, in which the lines of teeth are convex. There are about thirty-six lower pharyngeal teeth, six composing the anterior group, being conical-subulate; the rest are smooth and rounded grinders, of which the biggest is the posterior mesial one. There are about twenty-two on each upper pharyngeal bone, the exterior ones being more conical and less worn than the interior ones. The scales covering the body are large and thin, with membranous edges. There are twenty-six rows between the gill-opening and caudal, besides three rows more crowded on the bases of the caudal rays, and a fillet of small scales running a short way on the membrane between the rays. The lateral line makes an abrupt downward descent, a little beyond the dorsal and anal, for the entire breadth of a scale, and then resumes its straight course through the centre of the tail. It is marked on each scale by a slender undulating tube, which suddenly branches by three or four successive bifurcations in an arbuscular manner. The number of branchlets diminishes on the posterior scales. The fine fan-like streaks on the scales are about thirty in number.

The ventral fins are pointed. The eleventh dorsal spine exceeds the first in length by nearly one-third, the others being of intermediate height: they are all overtopped by little strips of membrane. The soft portion of the fin has a slightly-arched outline, somewhat higher than the spines; and the anal, similar in form, has shorter spines. The spines of both fins are slender, subulate and acute. The caudal is even at the end, or, when fully spread out, a little rounded.

When the specimen was taken from the spirits, the soft

dorsal and anal appeared very dark, the other fins yellowish or orange. The body also looked dark, but on detaching a scale from the back, the membranous pouch which enclosed it, was found to be of a lively purplish-red. All traces of coloured zones or spots, if any ever existed, had disappeared. The skin and membranes generally were very tough, and the fin-membranes thick and opaque.

The intestinal canal is a wide tube, the stomach being of a larger diameter than the rest, and having its internal coat densely villous. The villous plaits are reticulated, and become more and more delicate, until they disappear altogether, leaving the fourth part of the tube next the anus smooth. The first caudal vertebra has a narrowly linear-lanceolate inferior process, with a broad thin shoulder or plate on each side where it joins the body of the vertebra. Two holes for the passage of vessels exist in this process: each of the succeeding inferior processes of the spine have only one hole.

Mr. Lempriere informs me that this wrasse and the following one form a coarse food, disagreeable to some palates, but not unwholesome. Judging from the contents of their stomachs their food consists chiefly of *Crustacea*.

Length 18 inches.

In a manuscript account of the fish of Albany, King George's Sound, with drawings by Deputy Assistant-Commissary-General Patrick Neill, belonging to the British Museum, I observed a Labroid which is named "brown rock fish" by the sealers, and "pokong" by the natives, which has much resemblance in form to *L. tetricus*. The drawing is coloured dark blackish-green on the upper parts and chestnut-brown below, with about nine obscure dark bands crossing the back, and three or four on the head. The pectorals and caudal are dark; the ventrals, anal and dorsal brownish. The drawing is not finished minutely.

HAB. Tasmania.

*LABRUS FUCICOLA*, *vel* *TAUTOGA FUCICOLA*. Richardson.

*Labrus fucicola*, Richardson, Zool. Proceed., June 25, 1839. Zool. Trans. iii. p. 137.

RADI:—B. 6; D. 9|11; A. 3|10; C. 14; P. 13; V. 1|5.

Plate LIV., figs. 1, 2.

In this species the bones of the head are less uneven than in *L. tetricus*, and the opercular scales are more irregular, some small round ones being scattered among the larger ones. The cheek, as far forward as the fore part of the eye, and near to the angle of the mouth, is protected by four rows of small scales, the uppermost of which runs close to the narrow suborbital chain, and the lower one is more distant from the preopercular disk than in *tetricus*. As the scales rise before the vertical limb of the preoperculum towards the temples they are restricted to three rows. The scales covering the body are a little smaller than in the species just named, and the lateral line, which

makes the same almost vertical dip at the end of the dorsal, is traced on twenty-seven scales, in addition to which there are four rows on the base of the caudal rays, exclusive of the short scaly filets between the rays. The divisions of the mucous tube on the scales of the lateral line (fig. 2) are less numerous and bush-like than in *tetricus*. The teeth are comparatively stronger, and are disposed in very slightly convex, not straight lines, which gives a greater fullness to the upper jaw when viewed in front or from above, and less of the rectilinear rhomboid form which characterises the dental arrangement of *tetricus* and many species of *Julis*. The canine tooth at the angle of the mouth is slightly curved, and the interior rows of small teeth are more evident than in *tetricus*. The caudal is considerably rounded at the end, the anal is somewhat arched, and the fore part of the soft dorsal is a little higher than its posterior part. The dorsal and anal spines are similar in form and proportions to those of *tetricus*.

The only traces of the original markings remaining in the specimens when received were some faint lines curving over the cheek and nose, a dark bar crossing the pectoral at a third of its length, and a black spot at the base of that fin and on its first ray.

This species possesses nine abdominal vertebrae and sixteen caudal ones. The first of the latter differs from the corresponding one of the preceding species in its inferior process, having an acute shoulder instead of a rounded one, in its limb being narrowly linear, not lanceolate, and in its lower opening being elliptical and much larger than the round one next the centrum of the vertebra.

Length of two specimens procured at Port Arthur, 11½ and 15 inches.

A drawing of a wrasse, made at the port just named, by a convict under Dr. Lhotsky's inspection, and closely resembling this species, represents the general colour of the upper parts as dark plum-purple, the belly fading to buff, with four pale spots on the back, one of them on the suprascapular, another close to the eighth spinous ray of the dorsal, and two others touching the base of the soft dorsal, the distances between the three posterior ones being equal. Our figure in Plate LIV., being executed from a dried specimen, shows the lips less fully developed, especially the preorbital ones, than in the recent fish; and the artist, fancying that he could distinguish the pale spots under the dorsal, has introduced them, but he has omitted the bar on the pectoral which remains in the dried fish.

The Labroid represented in No. 9 of D. A. C. G. Neill's drawings, already quoted, is probably this species. It is called by the sealers the "common rock fish," by the natives "paril," and is said to be very common on rocky shores and to take the hook readily.

HAB. Coasts of Tasmania and South Australia.

Another of Mr. Neill's drawings may also be noticed here. It is numbered 37, and is named "black fish" by the sealers, and "paril," "kuhoul" or "bimburn" by the natives. It is considered by Mr. Neill to be a variety of the "common paril" above mentioned, is stated by him to be also an inhabitant of rocky shores, and to grow to some size. It is most probably a distinct species of the genus *Labrus* or *Tautoga*. Mr. Neill's figure is coloured dark

neutral tint, paler towards the belly, and nearly black on the top of the head, sides and fins. It is thickly and irregularly speckled down to the middle of the height of the body and head with rust-coloured dots, which are largest on the back, and much smaller on the sides, there being many on each scale. There are no spots on the fins. The spotting of this fish corresponds in some respects with the *L. pacitopleura* of New Zealand (*Hist. des Poiss.* xiii. p. 95), and it is possible that the drawing may be designed to represent that species, but the general tint appears to be much darker.

HAB. King George's Sound.

*LABRUS LATICLAVIUS, vel TAUTOGA LATICLAVIA.*

Richardson.

*Labrus laticlavus*, Richardson, Zool. Proceed., March 10, 1840. Zool. Trans. iii. p. 139.

RADI:—B. 5; D. 9|11; A. 3|10; C. 12½; P. 12; V. 1|5.

Plate LVI., figs. 3—6.

This very handsome wrasse seldom exceeds a foot in length, has a more elegant form than the three species we have already described, and comes nearer to *Tautoga* in having fewer scales on the cheek. Its general aspect is that of a *Julis*. The head is neat and small, its length being contained four times and nearly one half in the total length, caudal included. The membranous flap of the gill-cover is produced so as to form a rounded lobe, which extends nearly its own breadth beyond the superior attachment of the operculum. In *L. tetricus*, *fucicola* and *inscriptus*, the operculum is joined to the shoulder by a membranous production, which reduces the gill-opening to a vertical slit, not a curved one as in the present species.

The scales which cover the operculum and part of the suboperculum are thin and large, and a vertical row of six small scales descends from the temples, before the limb of the preoperculum, not quite to its curve, the rest of the cheek being naked. The integuments of the head are less spongy and porous than in the *Labri* already described, and the gill-membrane is narrow. There are eleven teeth on each side of each jaw, with a tolerably strong canine tooth at the angle of the mouth: the inner row of small teeth is about as numerous as the outer one, and in the dried specimen they are tolerably prominent, especially in the upper jaw. There are about forty-five teeth in the lower pharyngeal bone, and twenty in each of the upper ones (figs. 5, 6).

The scales of the body have equally thin membranous edges with those of *tetricus* and *fucicola*, but their fan-like streaks are more strongly developed. The lateral line is composed of twenty-six scales, exclusive of two without tubular elevations on the base of the caudal, and the short

fillets of scales between the rays, and it curves as usual opposite to the end of the dorsal to the depth of one entire scale. Its tubular elevations have a compact arbuscular form, springing first from the central tube in a palmated manner, and dividing into simple and forked tubes. Most of the tubes are pierced by pores or lateral openings. The spinous dorsal is even, and a little lower than the soft part. The ventrals are acute pointed; and their membranes, and those of the pectorals, are delicate and transparent. The pectorals and caudal are rounded.

A drawing, made by a convict at Port Arthur, of this species, presents the following colours. Ground tint of the head, back and sides dark green. A lake-red stripe commencing at the supra-scapular, and another beginning above the base of the pectorals, run parallel to the back, and unite behind the dorsal into a single stripe, which runs to the extremity of the caudal. Over the beginning of the anal a large blotch from the under stripe, but of a deeper colour, descends nearly to the ventral surface. The breast, belly and sides of the tail along the base of the anal, are tinged with a more dilute and purplish lobe. All these stripes are bounded by Berlin-blue lines, composed of a series of streaks, one on each scale. The cheek is blue, and the rest of the head green, traversed by lake-red lines. The pectorals and ventrals are carmine, the dorsal purplish-red, with many small blue dots between the summits of the rays, a narrow vermilion border, and an extreme edging of clear blue. The anal has a narrow stripe of vermilion along its base, then a broad bar of primrose-yellow, edged above and below with blue, and, lastly, a band of purple as broad as the yellow one, spotted thickly with blue and edged with the same. The caudal is plum-purple, dotted with pale blue at the end. The specimens, though long kept in spirits, still show some of these markings, and the lake-red lines may be enumerated more precisely from them than from the drawing, viz., two of them cross the preopercular, three descend from the orbit over the cheek, and two cross the temples to the nape, besides some undulating lines on the interoperculum. These lines are blue in the specimens and red in the drawings, but a similar change of colour is common among the *Labri* after death. The specimens also show five short plum-blue lines on each side beneath the pectorals, and three such lines on each side of the anal, not shown in the drawing. Mr. Lempriere states, that when newly taken this fish exhibits all the colours of the rainbow.

The vertebrae are nine abdominal and sixteen caudal ones. The first caudal one has its descending process composed of two slender arms, which spring directly from the centrum, and meet only at their tips, enclosing a single, wide, elliptical arch. The contents of the stomach were small *Crustacea*, mixed with littoral sea-weeds.

In Deputy Assistant-Commissary-General Neill's drawings of the fish of King George's Sound, there is a representation (No. 47) of this fish, under the name of "kauparill" or green fish. He states it to inhabit the rocky shores of that locality, and to be rare. Mr. Lempriere says, that at Port Arthur it is prized as an article of food.

Length 11 inches.

HAB. Coasts of Tasmania and South Australia.



*LABRUS PSITTACULUS*, vel *TAUTOGA PSITTACULA*.  
Richardson.

*Labrus psittaculus*, Richardson, Zool. Proceed., March 10, 1840.  
Zool. Trans. iii. p. 141.

RADI:—B. 5; D. 9|11; A. 3|10; C. 12½; P. 13; V. 1|5.

Plate LVI., figs. 7—10.

In this species there are about fourteen or fifteen teeth on each side of each jaw, and the pair next the symphysis are proportionally larger than in the species already described. The canine at the angle of the mouth is slightly curved, the inner row of small teeth is conspicuous on the front third of the jaws, but fails posteriorly altogether on the lower jaw, and there are merely some obscure indications of interior teeth on the posterior halves of the premaxillaries. The pharyngeal teeth are represented in figures 9 and 10.

The body is more compressed than is usual in a *Labrus*: the greatest depth of the body a little exceeds the length of the head, which forms one-fourth of the total length. The operculum and half of the suboperculum are covered with large round scales, and there are four rows of scales on the cheek, which cover nearly as much of it as in *L. inscriptus*. The lobular tip of the gill-cover is narrower than that of *L. laticlavius*, but the gill-opening is as much closed by membrane at the shoulder as in *inscriptus*.

The lateral line, containing twenty-six scales, curves at the nineteenth, to be continued straight through the tail. There is one scale in addition on the base of the caudal rays without the tubular eminence, making twenty-seven in all, and small scaly fillets exist as usual between the rays. The central tube branches in a palmate manner, but the forks are generally fewer than in *laticlavius*, the ultimate branchlets seldom exceeding eight or nine on the anterior scales, or half that number on the tail, nor are they perforated by pores as in *laticlavius*.

The dorsal spines increase gradually in height from the first to the ninth, which is one-third taller. The soft dorsal is rather higher, and its rays increase slightly in length to the penultimate one, which is the tallest. The soft rays of the anal are nearly all of one length, and its shorter spines, and those of the dorsal, are overtopped by membranous points. In this species and *laticlavius* the anal and dorsal are opposite to each other, while in *L. tetricus*, *fucicola* and *inscriptus* the anal ends a little further from the base of the caudal. The caudal has its lower angle rounded slightly, and its upper one pointed and projecting a little. *L. psittaculus* and *laticlavius* have a gill-ray fewer than *tetricus*, *fucicola* or *inscriptus*. The European *Labri* and American *Tautoga* are noted in the *Histoire des Poissons* as having five gill-rays like *psittaculus*.

The spine is composed of nine cervical and sixteen caudal vertebrae. The first caudal one differs from that of *laticlavius* in the limbs of the elliptical arch, formed by its plenapophyses, being broader, and uniting above so as to enclose a small opening next the centrum. The descend-

ing process of the next succeeding vertebra is also broad, and perforated by two holes.

The specimen in spirits had an uniform hyacinth-red colour, without any other spots than five or six rows of honey-yellow dots on the soft dorsal and anal, and a few streaks behind the corner of the mouth.

Length 10½ inches.

HAB. Shores of Tasmania.

The "KNELMICK," "MINAME" or "MINAMEN" of the natives of King George's Sound, which is named "parrot fish" or "common rock fish" by the sealers of the same locality, seems to be another species of this group, and to resemble *L. psittaculus* closely in the form of its body and caudal fin. Its soft dorsal appears, however, to be more pointed. I have seen no specimen, but a drawing of it by Deputy Assistant-Commissary-General Neill (No. 18) enables me to describe the colours. Some scales are obscurely indicated on the cheek and gill-cover, and from one scale taken from the back, and another from the belly, which accompanies the drawing, the scales generally appear to be rather smaller than those of *psittaculus*. The ground tints of the head and body are green, with faint longitudinal lines of lake corresponding to the rows of scales. The spinous part of the dorsal and basal half of the soft portion are dark green: the upper part of the latter and all the other fins are deep lake-red. Mr. Neill numbers the rays as follows: "D. 8|11; A. 2|10; P. 12; V. 15." It is probable that a short spine at the beginning of the dorsal and one at the anal have been overlooked. Length of drawing 7½ inches.

HAB. King George's Sound.

The "KNELMICK," "KIELMICK" or "KIELNMICK" of the natives of King George's Sound, is evidently another species of this group, much resembling *L. laticlavius* in its profile. Deputy Assistant-Commissary-General Neill, by whose drawing alone the species is known to us, enumerates the rays as follows: "D. 22; A. 14; P. 13; V. 5." He says that it is a common inhabitant of rocky coasts, and is a very indifferent article of food. It is taken with the hook. The scales are smaller than those of any of the species described above, and the drawing represents them as covering the entire gill-covering, including the interoperculum, but it is possible that this may have been an oversight. The dorsal, anal and back are coloured brownish-red, the head shows a more dilute tint of the same, and the caudal is reddish-orange. The body and vertical fins are traversed by stout blue bars, forming horizontal rows, about three in number on each of the fins, and ten on the body. The blue lines on the back are oblique; in the middle of the tail they are replaced by round spots; and on the caudal they run throughout the fin between the rays. Three blue lines descend from the eye and snout over both jaws, and three curve downwards from a large blue patch on the preoperculum over the cheek and interoperculum. There is also a blue chevron on the supracapular. The pectorals and ventrals are pale, with reddish rays. The drawing is 9½ inches long.

HAB. King George's Sound.

LABRUS LUCULENTUS, *vel* TAUTOGA LUCULENTA.  
Richardson.

RADI:—B. 5; D. 9|11; A. 3|10; C. 11, *vel* 12 $\frac{5}{6}$ ; P. 12;  
V. 1|5.

I am indebted to Dr. Mc William, so well known by his humane exertions on the Niger Expedition, for five specimens of a *Labrus* from Norfolk Island, closely allied to the preceding species. A dried specimen in the British Museum, which was brought from Western Australia by Mr. Gould, shows that its range is extensive.

The profile is elliptical, the jaws forming the acute apex anteriorly, while behind the ellipse ends in the trunk of the tail, whose height is contained twice and one-third in the height of the body, and this again thrice and one-third in the total length, caudal included. The descent from the dorsal to the mouth is an even, long slope, with a slight convexity: the belly is rather more convex than the back, and the compression of the body is considerable, its thickness being contained twice and two-thirds in its height.

The head forms two-sevenths of the whole length of the fish, caudal included. The eye is of moderate size, and the diameter of the perfectly round orbit is equal to one-fifth of the length of the head, measured to the extreme edge of gill-flap. It is situated near the profile, and two diameters from the symphysis of the intermaxillaries. The breadth of the preorbital is greater than the diameter of the eye, and the preorbital lip is developed about as much as in the Australian species already described. The cheek is protected by small tiled scales, which fill up the curve of the preoperculum, where there are six rows: they come close to the disk of the preoperculum, but leave a broad smooth margin beneath the orbit, and also a space at the corner of the mouth. The preorbital, mandible, snout and whole top of the head are also smooth, as is likewise the broad, thin and flexible interoperculum. When this bone is complete it laps over its fellow, and completely conceals the gill-membrane; but it is more or less deficient in four of the specimens out of five, either on sides of the fish or on one only. The operculum and suboperculum are covered by three or four vertical rows of large scales, which are, however, smaller than those of the body. There are twenty-seven scales on the lateral line, with three rows above it and seven or eight below. On the anterior scales the lateral line is formed by a small sparingly-divided cluster of branchlets at the end of a long tube. The branchlets are mostly above the tubular line, and diminish in number posteriorly, so that at the flexure under the end of the dorsal only one upward branchlet remains. The scales are nearly as strongly striate on their uncovered disks as on their bases, the striae embracing all the circumference except a very small triangular portion on each side. The base of the dorsal, and in a less degree that of the anal, is protected by a scaly sheath. The base of the caudal is also sheathed. The dorsal and anal spines are slender, round, pungent, and tipped behind with small membranous processes. The soft rays are a little longer, but the outline of each of these fins is even, and they end

acutely, though not by prolonged points. The pectoral is acute above and rounded beneath. The ventrals are rather small, and, when fully spread, obtuse. The membranes of the fins generally, and especially of the ventrals and pectorals, are delicate and transparent.

The tooth next the symphysis on both jaws is about twice the size of the second one, and the rest diminish regularly to the corner of the mouth. They are subulate and acute, and about twelve in number on each premaxillary and limb of the mandible. There is also a small canine at the corner of the mouth. The inner small teeth are very distinct, particularly the mandibular ones, but they are confined to a single series on the front of the jaws, and do not run farther back than the third exterior tooth.

The following tracings of colouring and markings remain, after several years of maceration in spirits. A faint reddish tint prevails on the body, strongest along the dorsal and lateral line, giving indications of stripes. Below the lateral line each scale is marked at its base by a somewhat oblique descending silvery bar: this mark belongs to the integument beneath the scale and shines through. One dark purple line runs from the orbit, along the upper edge of the preorbital, to the tip of the snout. Another runs beneath the preorbital, along the under margin of the orbit, to the tip of the gill-cover. A series of purple dots trace out the line of the occiput, and there is a row on the temples. The tip of the gill-cover appears to have been coloured, and the cheek to have been brighter than the rest of the head. The pectoral shows a purplish-black ring at its base, with a silvery and reddish axilla. A black mark embraces the first two dorsal spines, and there is a black spot on the scaly sheath embracing the two first soft dorsal rays, with indications of a smaller spot at the fifth and sixth soft rays.

Length 6 inches.

HAB. Eastern and western coasts of Australia. Norfolk Island.

TAUTOGA MELAPTERA. Bloch. (*Labrus*.)

*Labrus melapterus*, Bl. 285, Schn. 247.

*Tautoga melapterus*, Cuv. et Val. xiii. p. 311. Richardson, *Annals and Mag of Nat. Hist.* xi. p. 358.

RADI:—B. 5; D. 9|10; A. 2|10; C. 13 $\frac{1}{2}$ ; P. 13; V. 1|5.

This species is known to the natives round Port Essington by the name of "ardilga." The reader is referred to the *Histoire des Poissons* and the *Annals of Natural History* as above quoted for an account of it.

Length 13 $\frac{1}{2}$  inches.

HAB. Sea of Java, Torres Straits and the coasts of North Australia.

LACHNOLOAIMUS, *vel* COSSYPHUS CYANODUS. Richardson.

*Labrus cyanodus*, Richardson, Ann. and Mag. of Nat. Hist. xi. p. 355.

RADI:—B. 6; D. 13 $\frac{7}{8}$ ; A. 3 $\frac{10}{11}$ ; C. 12 $\frac{1}{2}$ ; P. 15; V. 1 $\frac{5}{8}$ .

Plate LV., figs. 5—7. (*L. arilca*.)

This fish wants the flexible filamentous prolongations of the anterior dorsal spines, which give such a peculiar character to the *Lachnolaimi* of the Caribbean Sea; and it differs from them in its more elevated profile, and consequently in its general physiognomy, which is more like that of *Noracula*, especially in the face. It has the preorbital lips, the scaly gill-covers and cheeks, with the continuous lateral line, and other general characters of *Labrus*, but it differs from that genus in the dentition both of the jaws and pharyngeals, in which it agrees with *Lachnolaimus*. In the structure of its jaws, the upper one especially, it corresponds nearly with *Cossyphus atrolumbus*, and most likely with some others of that genus, the *Cossyphi* merely having the teeth on the edge of the jaw a little more prominent, and those incorporated with the bone interiorly so much developed as to render the surface granular. Though the vertical fins of our fish move in scaly sheaths, they are much less evident than in *Cossyphus*, and enclose only the bases of the fins. It seems to have the closest affinity to the *Labrus macrodontus* and *japonicus*, and to the *Cossyphus schenkeinii* of the *Histoire des Poissons*, differing from them rather in specific characters than generic ones, and agreeing with them in dentition and in the number of the fin rays.\*

This fish obtains the names of “*agurmin*” and “*arilka*” from the native tribes in the vicinity of Port Essington. The specimen we have figured was taken in Endeavour Straits, on the reef which surrounds Bramble Island.

The profile of the snout rises at an angle of 45°, with a slight concavity opposite the preorbitals, and a convexity at the nostrils, where it begins to round gradually over the eye into the nearly horizontal curve of the nape. Along the whole extent of the dorsal, the outline of the back descends to join the concave sweep of the trunk of the tail. The outline of the belly wants the bold convexity of the forehead and nape, but is otherwise nearly similar to the dorsal line. The height of the trunk of the tail exceeds one-third of the greatest height of the body, and its length between the dorsal and caudal is nearly one-sixth of the total length of the fish.

The length of the head is contained thrice and two-thirds in the length of the fish, and its height is not above a ninth or tenth part less than its length. The eye, of a moderate size and round, is situated above the level of the

angle of the gill-cover, having a very high cheek and interoperculum beneath it, and a large preorbital descending obliquely before it. It is two diameters of the orbit from the end of the snout, and rather farther from the tip of the gill-cover. The nostrils are very small simple openings, situated nearer to the eye than to the edge of the snout. The preorbital lip is wide, and continuous over the premaxillary pedicles and cheek, forming a covering for the whole of the maxillary and the outer half of the premaxillary when the jaws are retracted. The obtuse end of the maxillary just appears at the corner of the mouth when the jaws are extended. The premaxillary lips are full and plaited, and the mandibular one folds back on the limb of the jaw. The gape of the mouth is low down, and scarcely extends as far back as the anterior nostril. The mandible when depressed is equal in length to the premaxillary when fully protracted, and ascends a little when the jaws are retracted. The premaxillaries are moderately protractile: each is armed anteriorly by two strong canines, the one next the symphysis being the largest: they are conical, slightly curved, directed forwards and downwards, and both are closely incorporated with the bone, so that there appears to be no line of separation between the root of the tooth and substance of the bone. The jaw interiorly is naked and polished, as if worn or enamelled, for a considerable breadth, and its edge, which is rather obtuse throughout, is a little swollen behind the canines; and close to the symphysis there is a small conical tooth immediately behind the largest canine, and two or three minute granular ones appear as if passing out of the bone on the lateral edge of the jaw. The mandible exhibits the same polished edge and interior surface as the premaxillary, and is also armed with two stout canines directed forwards and upwards. There is no small interior conical tooth at the symphysis, but a series of very small granular teeth on the edge of the jaw is visible to the naked eye, particularly two or three of them behind its middle. There is no canine at the corner of the mouth. The upper pharyngeals (fig. 6) are two small bones with flat granular disks, and the teeth shining through, as on the jaws of a *Scarus*. The teeth and jaws are greenish.

The cheek is protected by small, remote, round scales, forming five or six rows between the orbit and curve of the preopercular disk. There are six in a single series on the interoperculum, and the operculum and suboperculum are covered by six rows of larger ones closely tiled. The disk of the preoperculum is naked, and the interoperculum is very broad, its edge being membranous. The gill-cover is also bordered with smooth membrane, beneath whose edge the rather narrow gill-membrane folds. The rays of the latter are long, slender, curved and flexible. The tip of the gill-cover is a rounded lobe, rendered more prominent by a wide curve narrowing the suboperculum.

The lateral line is traced on twenty-nine or thirty scales, the last two of which are as large as the others, and sheath the base of the caudal rays. The exposed disks of the scales are without striae; their bases are marked by twenty-five or thirty, diverging in a fan-like way. The scales forming the lateral line have each a long tube, with six or seven spreading divisions at the end. On the posterior

\* See also *Cossyphus cyanostolus* and *onmopteris* of ‘The Report on the Ichthyology of China,’ p. 256, 257, which agree generically with the species named above, and in the numbers of the rays. *Labrus reticulatus* of the *Fauna Japonica* has a different number of dorsal rays, but similar construction of the jaws with the other species of this group.

scales the branches are rather fewer and spread less (fig. 7).

The dorsal spines are slender, subulate and acute, and increase gradually in height to the last or thirteenth, which is nearly twice as tall as the first: a small point of membrane overtops each of them. The soft rays rise above the last spine nearly in the same degree that it exceeds the first one. The anal is similar to the posterior part of the dorsal, and ends a little nearer to the caudal. The latter is truncated at the end, with a slight acute projection of the upper corner. The pectoral is rather large and triangular, the ventrals comparatively small and pointed. There are no small scales on the fins.

The specimen here described, and figured in Plate LV., is a dried one, and measures  $8\frac{1}{2}$  inches. Another, measuring  $12\frac{1}{2}$  inches, was taken at Port Essington, and has the dorsal and anal more pointed.\* One example in the Haslar Museum, presented by John Gould, Esq., is twenty-two inches long, and differs from the preceding in its teeth and jaws not being green, and in having a stout canine directed outwards from the angle of the mouth. The upper limb of its preoperculum is finely and acutely serrated, the serratures pointing upwards. This is most probably a distinct species, and the British Museum possesses a large mounted specimen of it which was also obtained from Mr. Gould.

HAB. Northern coasts of Australia.

COSSYPHUS, *vel* LACHNOLAIMUS GOULDII. Richardson.

*Labrus gouldii*, Richardson, Ann. and Mag. Nat. Hist. xi. p. 353.

RADI:—D.  $11\frac{1}{10}$ ; A.  $3\frac{1}{10}$ ; C.  $14\frac{3}{5}$ ; P. 17; V.  $1\frac{1}{5}$ .

In the Annals and Magazine of Natural History, as above quoted, I described a Western Australian fish, which in its dentition makes a near approach to *L. cyanodus*. I stated there that the specimen consisted of the dried skin of one side of the fish, with the bones of the head cut away, so that the proper form of the profile could not be ascertained; but since that was written I have re-

cognized the species among D. A. C. G. Neill's drawings of the fish of King George's Sound. It bears among the natives the various names of "koojemick," "quejiumuck" or "knowl," and grows to a large size. Mr. Neill mentions one weighing 28 lbs., which was speared by a native, but not killed till after a long struggle, the fish being very powerful.

In the drawing the profile from the snout to the nape is a low arc, but in the specimen it forms about the sixth of a circle. The head is short, the belly more arched than the back, and the trunk of the tail thick, the fish being clumsily made. The preorbital lip is simple, the premaxillary one thick and plaited. Each premaxillary and limb of the mandible is armed in front with two stout, conical, bluntish teeth, whose roots are incorporated with the bone, all of them having a narrower stem or neck, which is evidently covered by the soft parts in the recent fish. The tooth next the symphysis above and below points obliquely forwards; the other one outwards and downwards or upwards, as it is above or below. The surfaces of both jaws are smooth and naked, and the bone swells out slightly behind the canines, but forms a flatish ridge on the lateral parts of the jaw. On the intermaxillary there is a small blunt tooth, no bigger than a pin's head, immediately behind the front canine, and many still more minute rounded teeth appear as if ready to burst from the bone all over its surface, but are scarcely prominent enough to render it uneven: the outer edge of the ridge is a little uneven, but only two minute angles can be considered as teeth. There is no canine at the corner of the mouth. On the mandible there are two small granular teeth at the symphysis behind the front canine; minute rounded teeth incorporated with the bone all over its surface, and merely shining through; and also an exterior range of nine or ten small conical or rounded teeth: of these the middle ones are the most prominent, and are the only ones that rise above the edge of the grinding ridge. The snout, mandible, top of the head to the occiput, preorbital, a considerable space bordering the eye beneath, broad disk of the preoperculum, and lines surrounding the supra-scapular and temporal clusters of scales, are naked. The preoperculum has its free edge augmented by an even membranous border, without any visible serratures. The cheek is furnished with small, vertically oval, remote, impressed scales, which form seven or eight rows in the curve of the preopercular disk, but diminish to two towards the temples, where the scales are larger. The operculum is covered by five rows of scales, which increase rapidly in size towards the edge of the gill-flap. One row of larger scales conceals the suboperculum; and five rows of smaller ones, though not so small as those on the cheek, cover the interoperculum, the lower edge of this bone being smooth. The scales of the body are large, there being only forty on the lateral line, and six rows above it. The scales of the nape and breast, and those covering the supra-scapulars, are smaller: the largest are on the flanks; and one taken from that part of the individual mentioned by Mr. Neill as having weighed 28 lbs., measures 1.3 inch in length and 1.1 in width. It is bounded by three nearly straight sides and an elliptical

\* In the specimen which is figured the colours were effaced. The one described in the Annals and Magazine of Natural History (ix. 355) retained some indications of the darker tints, viz., "The top and sides of the head have a dark brownish hue, which is separated from the inferior orange or reddish-yellow parts by an even line running beneath the pectoral fin and preoperculum to the angle of the mouth. There is a purplish-brown patch on the chin. The light tints of the under surface rise in the axilla of the pectoral to the middle of the side, and are continued at that height to the caudal. The upper parts have a leaden hue, not very uniform. Three dark bars descend from the spinous part of the dorsal to the lateral line, there is a fourth before the fin, and a fifth is more obscurely seen at the end of the soft part of the fin, all these bars being broader than the intermediate paler spaces. There are no markings on the dorsal, though the colour of the spinous part is somewhat deeper than that of the soft part. Two diaphanous lines traverse the middle of the anal, and five similar ones cross the caudal, followed by dots on the end of the fin." The length of this specimen was 10 inches.



curve on the free edge, and is oblique angled. The base is marked by about thirty-three slightly-radiating striae, many of them terminating short of the edge, and the sides are bordered by some elevated lines, the greater part of the disk being smooth, except the exposed part, which is covered by integument that becomes somewhat granular in drying. The scales of the back, and those on the base of the caudal, are more oblong, with fewer radiating striae; more numerous lateral lines and a less smooth disk. The scales composing the lateral line show much smaller disks *in situ* than those above and below them, and a raised tube on each scale ends in a bushy cluster, the branches of which are not very distinct in the dried specimen. The line is very slightly arched anteriorly, and becomes quite straight in the trunk of the tail.

The spinous part of the dorsal is moderately arched, and is lower than the articulated portion, which ends in a point formed by the penultimate and two preceding rays, the eighth soft ray being the longest. The spines are of a very unusual form, being very strong, but compressed, like the blade of a knife with a blunt or rounded point, the last three, however, being more cylindrical and acute. The membrane is deeply notched behind each spine. The soft part of the anal corresponds with the dorsal, but the spines are even broader and more obtuse than the dorsal ones. It would appear from Mr. Neill's observations, that some individuals have only one, others but two anal spines. A few small scales exist on the bases of the jointed portions of the anal and dorsal; and these fins seem to move in a low furrow, not nearly so much developed as the usual scaly sheaths of the *Cossyphi*. The ventral is pointed; and its greatly compressed, wide, blunt spine, is only half as long as the second and third jointed rays, which form the point of the fin. The pectoral is much rounded, and the anal is even with the angles rounded. Mr. Gould reports the colour as an uniform dark olive tint, and Mr. Neill's drawing is coloured with a dark neutral tint, approaching to grayish or purplish-black along the dorsal aspect and on the fins, and fading to blackish-gray on the sides.

Length  $3\frac{1}{2}$  inches.

HAB. Western Australia.

ODAX LINEATUS. Quoy et Gaimard. (*Malacanthus*).

*Malacanthus rayé*, Quoy et Gaimard, Zool. de l'Astrol. p. 717, Pl. 19, f. 2.

*Cheilio lineatus*, Cuv. et Val. xiii. p. 354.

RADI:—B. 5; D.  $20\frac{1}{2}$ ; A.  $4\frac{1}{2}$ ; C. 25; P. 12; V. 15.

Plate LX., figs. 1—5.

This fish has hitherto been known to ichthyologists only by the figure published by Quoy and Gaimard, the specimen having been lost after the drawing was made by M. Gressien, an officer of the Astrolabe, who presented it to M. Quoy. It is probable, from the terms in which this is

mentioned by M. Quoy, that he never saw the fish, but described it from the drawing, which would account for the errors in the account of the jaws, dentition, gill-cover, &c., and his not discriminating the simple from the jointed rays of the dorsal and anal. A very perfect and beautifully coloured drawing of the species, now in the possession of Robert Brown, Esq., had been made long before, on Flinders' voyage, by Mr. Bauer; and a specimen in tolerable preservation, from which our figure was taken, enables us to give the following description.

This fish is moderately compressed, with a fusiform profile, the tail becoming gradually higher at the base of the widely elliptical and acute caudal. The height, which is greatest under the middle of the dorsal, is about equal to one-seventh of the whole length of the fish, and the narrowest part of the tail is equal to half that height. The length of the head, including the tip of the gill-cover, forms less than one-third of the total length, caudal included. The eye is equidistant from the extremity of the upper jaw and tip of the gill-cover, and is near the upper profile, but does not actually touch it: its diameter is about one-fifth of the length of the head, and equals exactly the distance between the orbits. The thickness at the nape is one quarter less than the height there.

The posterior nostril, which is close to the eye, is a small open orifice; the anterior one can be closed by a valvular lip. The scales on the top of the head are not much smaller than those of the body, and are separated from the nape and supra-scapular scales by a smooth transverse line, which is bent at each temple to run backwards to the upper angle of the gill-opening. The margins of the orbits are smooth, but the scales come forward between them to the posterior nasal-opening. The operculum, most of the suboperculum and the cheek are scaly (fig. 2), and there is also a row of scales on the interoperculum; but the snout, jaws and disk of the preoperculum are more or less porous. The thin and flexible interoperculum is quite entire, but when held up to the light it appears striated on its edge. The border of the suboperculum is smooth, and its cartilaginous strap-shaped tip projects over the axilla of the pectoral. This process is fissile, and splits into sixteen or eighteen pointed teeth. The operculum is, as is common in the *Labri*, connected by its upper edge to the shoulder, but the gill-opening extends well forwards below.

The mouth is cleft horizontally as far back as the anterior nostril. The preorbital, of a semi-lanceolate form, covers a space into which the side of the jaw glides, but there is no preorbital lip, the integuments of the snout being continuous with the well-developed premaxillary lips. These and the lower lip fold back over their respective jaws, even at the symphyses. The jaws have the usual narrow spoon-shaped form peculiar to *Odxæ*, with the quincuncial incorporated teeth shining through. The thin edges of the jaws are irregularly and minutely crenated; a few of the projections, particularly four or five on the upper jaw, at the angle of the mouth, appearing like minute teeth. There are also five small, conical, acute teeth, springing from the outside of the upper jaw posteriorly (figs. 2, 3). The upper pharyngeals are small, but thick, triangular, five-sided bones, one of the sides only attached

to the roof of the gullet, the others showing the incorporated teeth, which form a smoothish, granular surface, as in *Cossyphus* or *Lachnolepis*. The under pharyngeals have the general shape of the same bone in *Labrus*, but the teeth are incorporated with it, and merely produce the same kind of granular surface that exists in the upper pharyngeals.

The scales are of moderate size, of various breadth in different parts, but generally have the free edge curved in the form of a circle, the sides straight and parallel, and the bases, which show a slight indication of a middle lobe, are marked by from twelve to twenty-two fan-like furrows. The lines of structure on the sides are longitudinal, and the free edge is striated with minute corresponding teeth or crenatures on the edge. There are about thirty-eight scales on the lateral line, each with a simple straight tube (fig. 5): this line makes a descending curve over the end of the pectoral, and then runs straight. The dorsal commences over the base of the pectoral: its spinous rays are slender, and become as fine and flexible as hairs at their tips: the first one is the tallest, and rather exceeds the height of the body; the others decrease rapidly to the fourth, which is almost one half shorter, and then increase more gradually to the fifteenth, diminishing again slightly to the soft rays, which also decrease a little, giving an undulated outline to the fin. The anterior jointed rays are unbranched, the posterior ones merely forked at the tips. The anal has four unjointed rays, the first one being short and closely incumbent on the second, but having also a hair-like tip. The last jointed ray is divided quite to the base; the anterior ones are unbranched. The fin ends farther from the caudal than the anal. The caudal is widely elliptical, with an acute tip like some of the Gobioids, and embraces the rounded end of the tail by its short lateral rays. The pectorals are rounded, and the ventrals, which are attached under the third and fourth dorsal spines, have the first and second jointed rays prolonged. The spinous ray ends in a fine hair-like point, like those of the dorsal and anal: it is represented in the figure as jointed, through oversight.

In Mr. Bauer's drawing the ground colour of the body is mountain-green, with three orange-red lines running along the back, and seven deep yellow streaks on the sides. The uppermost of these streaks includes the fore part of the lateral line, and rises above it posteriorly. The lateral line is orange throughout. The head is yellow, with blue lines, which posteriorly pass into the green of the body. The dorsal is green, marked by four reddish-yellow lines, and an oblong deep blue stripe at the base, traversed by a yellow line. The anal is green, with two reddish-yellow streaks; and the rays of the caudal are orange, with blue tips. The ventrals are green, without markings; and the pectorals are reddish. The lines shown on the figure are drawn from the specimen in which the colours have changed, the lines on the back to carmine, the large spot on the back to black with carmine hues, and the caudal to brown.\*

\* I suspect that Mr. Gressin's figure was painted from a specimen which had already begun to decay, so that its green had changed to blue, &c.

The stomach is a straight tube, passing evenly into a delicate and more slender intestine, but too much decayed in the specimen for exact examination. The air-bladder is large, with an obtuse end touching the diaphragm, and the other extremity tapering to a fine point, which runs a little past the anus.

Length  $7\frac{1}{2}$  inches.

HAB. King George's Sound.

The "TOOBITOIT" or "TOOBETOOBIT" of the natives near Albany, King George's Sound, seems to be allied either to *Odax* or *Scarus*. Dep. Ass. Comm. Gen. Neill, from whose drawing alone the species is known to us, reckons the rays as follows: "D. 17 soft and 11 fleshy; A. 11 fleshy; P. 11; V. 4 strong rays." His figure (No. 33 lib. citat.) represents a subfusiform fish, tapering gradually from the pectoral region to the tail, which is about half the height of the nape. The back is less convex than the belly, the head less obtuse than a *Scarus*, but more so than is usual in *Odax*. The lateral line straight and continuous. The jaws scaroid. Ventrals under the middle of the pectorals, and beginning of the dorsal. Dorsal spinous rays, which would appear from Mr. Neill's note above quoted to be flexible, decreasing in height from the first to the seventeenth, which is less than half as high. The jointed portion of the fin rises abruptly to a greater height than any of the spinous rays, and the anal is like to it. The naked trunk of the tail forms a fifth of the whole length of the fish. The caudal has the upper and under angles projecting considerably, but is otherwise even at the end. The fish is black, with a greenish tinge on the belly. A spot round the anterior nostril, the inner part of first pectoral ray, and a stripe next the upper and under caudal rays, of a brilliant blue. The scales, of which three accompany the drawing, are moderately large, oblong, and rounded at both ends. Their bases are marked by ten or twelve fan-like lines, and their exposed disks covered with thick epidermis. This fish is an inhabitant of rocky shores, and is rare. The specimen was speared by a native, and as it is said to be unknown to the sealers it most likely does not take a hook. From the form of its jaws it feeds most probably either on sea-weeds or corallines. Length of drawing 13 inches.

HAB. King George's Sound.

LABRUS INSCRIPTUS, *vel* TAUTOGA INSCRIPTA. Richardson.

RADI:—B. ; D. 9|14; A. 3|10; C. 12 $\frac{1}{2}$ ; P. 13; V. 1|5.

Plate LVI, figs. 1, 2.

The profile of this fish, when its jaws are fully retracted, is a regular ellipse, with a vertical diameter equal to one-third of the transverse one. The head is acute in profile, but the ellipse is lost in the trunk of the tail, whose height is

contained twice and a quarter in the height of the body. The total length of the fish, caudal included, is three times and a half greater than its height, and four times greater than the length of the head. The thickness is rather less than half the height. The jaws are considerably protractile, the premaxillary pedicles going as far back as the middle of the orbit. The premaxillary lips are well developed and plaited, and, together with the mandibular ones, are lax, and capable of being turned back even at the symphyses of the jaws. Each limb of each jaw is armed by about twelve teeth in the principal series, strongest as usual, and longest next the symphysis, and diminishing rapidly towards the corners of the mouth. There is also a canine tooth at the corner of the mouth, implanted in the tip of the premaxillary, and a distinct interior row of small teeth above and below. The jaws can be so retracted under the preorbital that even the lower parts of the premaxillaries are covered. The eye, small, round and near the profile, is two diameters of the orbit from the point of the head, with the jaws fully retracted, and three diameters from the edge of the gill-opening. The latter is restricted above by membrane, which connects the whole upper edge of the operculum to the shoulder. Three rows of round scales cover the operculum and suboperculum, except the lower angle of the latter, which, with the broad semi-membranous interoperculum and disk of the preoperculum, are clothed with smooth skin. The cheek, as far forward as the front of the orbit and hind corner of the preorbital, is protected by small round scales, which descend from the narrow suborbitals to the border of the preopercular disk. There are seven or eight rows under the eye, which diminish on the temples to two or three. The upper range of scales show a longer disk, and the supra-scapular, as the integuments dry, shows like a large scale on the side of the nape. The skin of the top of the head and round the eye is full of pores. The lateral line is traced on twenty-five scales, exclusive of two or three without tubes on the base of the caudal, and the usual filets between the rays. The small tubes are divided by three successive bifurcations, and generally diverge considerably, few being close or bushy; but there is considerable variety in the number of branches on the different scales, without any regular diminution in their number either towards the head or tail.

The dorsal spines are subulate and very acute, with the membranous filets behind them, as in the preceding species. The soft rays are somewhat taller. The pectorals are rounded, the ventrals acute, and the caudal even, with the corners rounded off.

The colours are, in spirits, generally of a dull and dark brown tint, with a pale mark on each scale, bearing some resemblance to the characters of the Persian alphabet. There are some dark marks on the cheek and preoperculum, one on the base of the pectoral, and the membrane connecting the first three dorsal spines is blackish, with pale specks. There are also many pale specks on the anal.

I have suspected that this fish may be the Otabeitan *Iulis boryi* of Lesson (*Voy. de la Coquille*, Pl. 36), from the similarity of the markings, but his figure shows no scales on the cheek or lower half of the operculum, and all the fins have different forms from those of our fish. No

traces remain in the latter of the black crescent on the occiput, nor of the markings on the dorsal, pectorals, ventrals and caudal, which are shown in Lesson's figure. It is to be observed, however, that after a sketch of Lesson's specimen was taken, the fish was eaten, so that no comparative examination of the species has yet been made.

Length  $10\frac{1}{2}$  inches.

HAB. Norfolk Island. (Polynesia?)

#### CARANX GEORGIANUS. Cuv. et Val.

*Scomber micans*, Solander, Pisc. Austr. MS. p. 27. An Parkinson's fig. No. 88?

*Caranx georgianus*, Cuv. et Val. ix. p. 85. Jenyns, Zool. of Beagle, p. 71. Richardson, Ann. and Mag. Nat. Hist. x. p. 14.

"Madawick," Neill's Drawings of Fishes of King George's Sound, No. 32.

RADI:—B. 7; D. 8—1|27; A. 2—1|23; C. 19 $\frac{1}{2}$ ;  
P. 1|19; V. 1|5.

Plate LVIII., figs. 1—3.

This species was discovered at Opooragi, in New Zealand, on Cook's first voyage, and a drawing made of it by Sidney Parkinson, which is preserved, along with the rest of the Natural-History sketches taken on that voyage, in the Banksian Library. Solander's description is published in the Annals and Magazine of Natural History as above quoted. The specimen described in the *Histoire des Poissons* was procured by MM. Quoy and Gaimard in King George's Sound. We have had specimens from that locality also, and from the north-west coasts of Australia, collected by Surgeon Bynoe of the Royal Navy; also from Norfolk Island, through the kindness of Dr. McWilliam; besides some from New Zealand, in Sir James Ross's collection. Mr. Neill mentions that this fish is the "skipjack" of the sealers, the "madawick" of the aborigines; that it is a very common inhabitant of shallow sandy bays, and forms a staple article of food for the natives, who assemble in fine calm days and drive the fish into weirs formed of branches of trees and shrubs. It is occasionally taken by the hook. The close resemblance of the species to *C. luna* and *platessa* is noticed in the *Histoire des Poissons*. The specimen we have figured has a ray fewer in the dorsal and anal than the numbers stated by Solander, Cuvier, Jenyns and Neill. The scales are small, and exist on the interoperculum, preoperculum, suboperculum and breast. There are forty-one or forty-two scales on the straight posterior part of the lateral line, twenty-two of which are decidedly keeled and cuspidate. The cuspidate scales pass gradually into the smaller, soft, round ones, both on the base of the caudal and anteriorly. The tallest dorsal spine measures nearly one-third of the height of the body at the ventrals, and the free spines are close to the anus. The acute occipital ridge lowers a little as it approaches the point of the recumbent dorsal spine, and does

not actually touch it. From the anterior third of the orbit the ridge is less prominent, and more obtuse forward to the nostrils (fig. 3). The teeth are small, and just visible to the naked eye: viewed through a lens they do not appear acute, and are seen to form one row on the upper jaw, and two irregular crowded rows on the fore part of the mandible. The length of the head is contained four times and one third in the total length of the fish.

Length from 4 inches to 20 and more.

HAB. New Zealand and Australia.

#### CARANX PARASPISTES. Richardson.

RADI:—B. 7, vel 8; D. 8|— 1|21; A. 2|— 1|16; C.  $18\frac{1}{2}$ ; P. 1|21; V. 1|5.

#### Plate LVIII., figs. 6, 7.

I have been unable to refer this fish to any described species. It approaches most closely to the *Caranx djedaba* of Rüppell (Atlas 25, f. 3), but the caudal keel, though strongly shielded, tapers more posteriorly, and the points of the dorsal and anal are not falcate. *C. bajad* (Idem) has a smaller first dorsal, and *C. fulvo-guttatus* (Idem, 25, f. 7), has a less armed lateral line, and the free spines closer to the anal. *C. chrysophrys* (C. et V. ix. p. 37) has a conspicuous recumbent dorsal spine and more delicate caudal shields: the height of body and profile are also different.

*C. parasistes* frequents brackish lagoons at Port Essington, and is known to the aborigines by the name of "ork-budbood." Its upper jaw is armed on each side by seven rather stoutly subulate, but not tall teeth, which stand somewhat widely, and reach from the symphysis to the middle of the premaxillaries, within which there is a narrow band of minute recurved teeth, extending onwards to the corner of the mouth. The mandible presents a single row of short, subulate, curved teeth, reaching to the corner of the mouth, without any interior band. They are somewhat taller near the symphysis, but are not above half the size of the exterior premaxillary teeth. A very narrow stripe of minute teeth is visible on the edge of the palate-bone, in the dried specimen, by aid of a lens. The vomer is toothless.

The breast, temples and cheek are scaly; but the opercular pieces, preorbital, maxillary and lower jaw are scaleless. The supra-scapular region and nape are scaly, and a smooth crest, emitting some scaleless lines, having short lateral branches, runs back to the first dorsal. The tail is strongly keeled, and a lateral view of the keel, of the natural size, is represented in fig. 7. There are thirty-three shields, the anterior ones gradually diminishing, but the first of them, though small, is distinctly keeled, so that there is no gradual passage into the soft scales of the curved part of the line. It is situated over the axilla of the second free anal spine. The anus is remote from the free spines, and lies between the points

of the ventrals. The accessory keels on the base of the caudal are conspicuous. The caudal is deeply forked, the dorsal and anal falcate at their tips. There is no recumbent spine before the dorsal. The scaleless edges of the interspersed bones project strongly at the bases of the anal rays. The pectoral reaches to the third or fourth soft anal ray.

Length 17·5 inches.

HAB. Northern coasts of Australia and Torres Straits.

#### CARANX SPECIOSUS. Forskal. (*Scomber*).

*Scomber speciosus*, Forskal, p. 54

*Caranx tres-beau*, Lacepede, 111, p. 72, Pl. 1, f. 1.

*Scomber poloosoo*, Russell, 149.

*Caranx speciosus* (Lacep.), Rüppell, Atl. p. 96, young.

*Caranx petaurista* (Geoffr.), Rüppell, Atl. p. 95, Pl. 25, f. 2, adult.

*Caranx speciosus*, Cuv. et Val. 9, p. 130.

RADI:—D. 7|— 1|19; A. 2|— 1|16; C.  $17\frac{2}{3}$ ; P. 1|20; V. 1|5.

#### Plate LVIII., figs. 4, 5. (*C. poloosoo*).

The various synonyms of this widely-spread species are quoted above on the authority of the *Histoire des Poissons*, and the figure of a fish that has been so frequently represented has been given partly to balance the plate, by filling a corner, and partly to add, as far as our limits will allow, to the illustrations of Australian fish. A coloured drawing which we possess, of a specimen captured at Houtman's Abrolhos, on the western coast of Australia, represents the dark bars as traced on a bright yellow ground. We are informed, in the *Histoire des Poissons*, that the older specimens lose their yellow tints and dark bars, and become silvery. The bars, however, are strongly traced in Russell's figure of the "*poloosoo*," which measures 10 inches, and the profile of this figure agrees better with our fish than the *petaurista* of Rüppell does. The latter has, moreover, stronger shields\* on the tail, even taking its greater size into consideration, than our specimen, on which they are small and tender. In the *Histoire des Poissons* the teeth are said to be entirely wanting in the adult. In our specimen the jaws, particularly the lower one, are perceptibly rough to the touch, and the teeth can be seen by aid of a common lens. There is a recumbent spine before the dorsal.

Length of specimen 2·7 inches.

HAB. Coasts of Australia. Polynesia. Malay Archipelago. Indian Ocean. Mauritius. Red Sea. M. Busseuil, the naturalist attached to Bougainville's Expedition, first found it on the coasts of New Holland. (*Hist. des Poissons*).

\* Russell's figure is noted in the *Histoire des Poissons* as representing the shields too small, and is therefore quoted with some doubt as a synonym of *speciosus*. It agrees better with the Australian fish, as I have stated above, than any of the other plates quoted in the *Histoire des Poissons*.



## EQUULA SERRULIFERA. Richardson.

RADI:—B. 5; D. 8|17; A. 2|14; V. 1|5; P. 15.

Plate LIX., figs. 12—14.

I have many doubts of this fish being a distinct species from the *Equula ensifera* of the *Histoire des Poissons*, which is the *Scomber edentulus* of Bloch, pl. 428. Capt. Ross procured seven or eight specimens at Sidney, but they are all more or less mutilated in the rays or membranes of the fins; and some deficiencies in the largest example, which is figured in Plate LIX., have been supplied from the smaller ones.

The profile is steeper between the nose and first dorsal than that of *ensifera*, and the second dorsal spine is somewhat taller, if Bloch's figure be correct. It has a thin crest in front of its whole length, which M. Valenciennes compares to the blade of a sword; but the posterior face of the spine, instead of being equally trenchant, is rounded with a scarcely perceptible crest. The length of this spine exceeds half the height of the body. The third and fourth dorsal spines and the third anal spine have broader anterior crests than the second one; but these crests, instead of being quite entire as in the latter, are strongly serrated. M. Valenciennes does not notice these serrated blades or crests in his descriptions of the spines of any of the species, but they are represented in Buchanan-Hamilton's figure of *Equula raconia* (Plate 12), and exist also in *E. nuchalis* of the *Fauna Japonica*, whence I am led to conjecture that they may possess a generic character. The second anal spine is shaped like the second dorsal, but has a rather more evident posterior crest. All the spines in both fins are wrinkled on the sides in a peculiar manner. In other particulars of structure M. Valenciennes' minute description of *ensifera* applies to this fish. The pectoral and ventral fins differ in our figure from Bloch's representation of *ensifera*, but from the state of the specimens I cannot be certain that they are absolutely correct; and, from the integuments having shrunk, the artist has represented the interspinous bone as projecting before the anal spines in a manner which it does not do in the recent fish. The teeth are very fine and densely crowded, and take the curve of the edge of the jaw in a peculiar manner. Indications of nine or ten vertical bars, descending from the back down the upper half of the sides, may be traced in certain lights, and I suspect that a dark spot existed on the spinous dorsal. One of the small specimens shows such a spot distinctly, but the height of the body of this individual is not quite so great in proportion as in the one figured. Another small specimen has the front crest of the second dorsal spine serrated, so that there is either some variety in this respect or more than one species in Sir James Ross's collection, which the imperfect condition of the specimens will not allow me to determine.

Length  $3\frac{1}{2}$  inches.

HAB. Coasts of Australia.

## CAPROS AUSTRALIS. Richardson.

*Capros australis*, Richardson, Zool. Trans. iii. p. 72. Idem, Contr. to Austr. Ichth. Annals of Nat. Hist. xi. p. 171.

RADI:—B. 8; D. 9|30; A. 2|31; C. 13½; P. 11; V. 1|6.

Plate LIX., figs. 1—5.

In the Zoological Transactions, as quoted above, I named this fish from a drawing made by a convict in Tasmania for Dr. Lhotsky;\* and in the Annals and Magazine of Natural History, as above quoted, I gave a full account of this drawing, which proves to be erroneous in the numbers of the gill and fin-rays, and in some minor points. The specimen brought home by Captain Ross, which was procured by him at Sidney, enables me to give the figure in Plate LIX. and the subjoined description, though the tips of some of the soft dorsal and anal rays, and those of the pectorals, having been mutilated, I cannot be certain of the exact form of these fins. In the number of branchiostegous rays, the form and structure of the scales, and in some other particulars which will be noticed in the following description, *Capros australis* differs from *aper*.

Its body, which is fully as much compressed as that of *aper*, has a more regularly-elliptical profile, whose vertical diameter, under the commencement of the dorsal, is equal to two-thirds of the longitudinal one, measuring the latter from the tip of the lower jaw, with the mouth shut, to the setting on of the trunk of the tail behind the dorsal and anal. The face is not concave over the eye, except when the protrusion of the jaws depresses the profile, by the withdrawal of the pedicles of the intermaxillaries. The eye is smaller than that of *aper*, the preorbital is rounded and quite entire on the edge, instead of being crenulated or lobed, and the maxillaries descend when the mouth is projected. When the mouth is closed the lower jaw ascends, and forms the rather acute apex of the ellipse. The length of the head in that condition is contained thrice and a half in the entire length of the fish, caudal included. The preoperculum, instead of resembling that of *aper*, is more like that of *Zeus faber*, and is even longer, with a moderate curvature, a narrow disk, a minutely and irregularly crenated thin posterior edge, and no posterior rectangular expansion at the bend as in *aper*. The scaly cheek is high and oblique, like that of *faber*, in consequence of the length and inclination of the preoperculum. The bony operculum and suboperculum together are twice as high as long, and are truncated at the tips; but an addition of membrane gives a somewhat triangular but obtuse form to the gill-plate. The suboperculum nearly equals the operculum in size, and the long interoperculum shows behind the preoperculum, both above and below its bend. The jaws are armed with fine microscopical teeth, as are also the chevron of the vomer and edge of the palatine bones.

\* The conjecture hazarded in page 36 as to this drawing probably referring to *Zeus australis* proves to be erroneous.

The nostrils are similar to those of *aper*. The superior border of the orbit is thin, elevated and finely crenulated. Between the orbits there is a triangular space filled with smooth membrane, which covers the ends of the intermaxillary pedicles when the mouth is retracted, and then it is raised into an acute ridge, but when the mouth is protruded a depression is produced there by the sinking of the membrane. A small smooth space is continued from this membrane bordering the orbit down to the temples, but no striæ are perceptible on the cranium such as exist in *aper*. Behind the membranous spaces the head is densely scaly. The ridges on the mandible are quite smooth and rounded, and its posterior articular corner is rectangular, and, with the limb of the bone, is separable to a considerable depth from the isthmus, forming a flap. The gill-rays are eight in number, while in *aper* they are stated by M. Valenciennes to be only five. No scales exist on the gill-membrane. The nape is much compressed, but not absolutely acute on the edge, and it is less curved than that of *aper*, being nearly straight.

The first dorsal, consisting of nine tall, slender spines, with fine flexible tips, commences a little before the anal. Its first spine is very short, the second is the tallest, and its height is equal to three-fourths of that of the body; the others decrease gradually to the ninth, which has not above the fifth part of the height of the second. This fin stands on much less space than that of *aper*. The soft fin has comparatively short rays and a greatly arched outline. The anal is nearly similar to it, and commences with two little spines, the second one being the most diminutive. The naked part of the tail behind these fins is more slender than that of *aper*. Each ventral is supported in front by a long slender spine, with a flexible tip, and is followed by six jointed rays, which are forked at the end, the last two rays being as much separated at the base as the others. Behind these fins there is a deep smooth fissure, in which they lie when depressed, their tips projecting, one on each side of the anal spines. The walls of the fissure are made rigid by the scales which edge them, and the anus opens into its fore part near the axilla of the fins. The scales of the body are small and densely tiled, and feel very rough to the finger when drawn from the tail towards the head. This roughness is caused by a few short conical points, very different from the dense villosity of the scales of *aper*. The basal half of the scale is transversely striated by the lines of structure (see figures 4 and 5). The lateral line is conspicuous enough, and follows nearly the curve of the back. The membrane of the first dorsal and of the ventrals retains a blackish tint. The drawing above alluded to represents the fish generally as having a deep roseate hue.

Length 5 inches.

HAB. Coasts of Tasmania and southern parts of Australia.

Since the description of *ZEEUS AUSTRALIS* (p. 36, Pl. XXV., f. 1) was written, I have seen a more perfect specimen from Western Australia, now in the British Museum, which enables me to make some additions to the account of the species. The black lateral spot exists; the last rays of the dorsal and anal are divided to the base, so that the

formula for these fins may be D. 10—23 or 24; A. 4|22 or 23. The two anterior anal spines are in contact with each other, and spring from the same interspinous bone, without the membranous space between them, which is represented in our figure. There is a flat membranous space between the orbits, bounded on each side by a low ridge.

SAURUS UNDOSQUAMIS. Richardson.

RADI:—12—12; D. 11—0; A. 11; C. 17½; V. 9.

Plate LI., figs. 1—6.

I have been unable to reconcile this species with any described one, but having only the insufficient figures and descriptions of Bloch, Lacepede and Russell to refer to for assistance, in coming to this conclusion, it may possibly prove to be one of the species alluded to by Cuvier in the *Règne Animal*, but of which I have seen no account. The few members of the genus that I have had an opportunity of examining, and which are described in the 'Report of the Ichthyology of China, &c.,' already quoted frequently, differ from each other considerably in their dentition, which, if duly attended to, may probably furnish useful characters for the distribution of the species into groups.

The height and thickness of *S. undosquamis* are about equal at the shoulders: the back is flatly rounded from the dorsal to the occiput, and the breast is flat from the ventrals to the isthmus, while the sides are convex and more prominent. From the dorsal to the caudal fin the compression is decided, though not great, and the sides are flattened, the back remaining rounded. Posterior to the anal the height is about one-third greater than the thickness. The head forms a fourth of the length of the fish, excluding the caudal, or rather more than a fifth if that fin be included. Its height and breadth at the temples are equal, its sides are flat and vertical, and it is also flat above, but excavated by a wide shallow groove between the orbits. When viewed from above (fig. 2) the upper bone of the humeral chain appears like a tapering, but not acute scale, at the angle of the gill-opening; the borders of the orbits are seen to be prominent, and the eyes to encroach much less upon the upper aspect than in a *Saurus* obtained by Sir Edward Belcher, which I have described in the Report alluded to, under the name of *S. argyrophanes*. *S. undosquamis* further differs from this species in having the snout considerably rounded instead of very acute and more elongated, and in having a small mesial conical point rising near its end, being seemingly a projection of the symphysis or pedicles of the intermaxillaries. The profile forms a low arc from the end of the snout to the orbits, and from thence to the dorsal the line is nearly straight, with a very slight ascent. The diameter of the eye is equal to the length of the snout before the orbit, or to about one-fifth of the length of the head,

and it is about one-third less than the space between the orbits. In the shortness of the snout this species resembles *Salmo fatens* of Bloch, 384, f. 2, *S. varius* of Lacepede, v. iii. f. 3, *Osmerus lenniscatus*, Idem, v. vi. f. 1, and *Salmo badimottah* of Russell, 172, but its form is not identical with any of these figures.

The cleft of the mouth is equal to two-thirds of the length of the head, and its middle, when viewed laterally, corresponds to the centre of the eye. The jaw teeth are slenderly subulate, with thin, two-edged, very acute and transparent points, none of them being barbed or hastate.\* The premaxillary teeth are arranged in four rows, in a quincunial order, but not very regularly, and they are rather remotely placed in their respective rows. The teeth of the outer row are very short, those of the inner one are much taller, the intermediate rows being of intermediate height. The anterior teeth of the inner row are curved inwards and backwards, while the posterior ones are inclined a little forwards. The mandibular teeth are similar, but in five rows. The palatine teeth are more crowded and regularly set, in two rows, all inclined towards the mesial line, the inner row being tallest, but scarcely equalling the third row of the intermaxillaries in height. There is also an elliptical patch of teeth within the palatine ridge, apparently implanted on the ento-pterygoid, in which there are five rows, all inclined inwards, and increasing in height from the outermost to the innermost.† There are no teeth on the vomer. The teeth on the tongue are short, densely

crowded, and scarcely visible to the naked eye, but by the aid of a lens they are seen to be stoutly subulate, acute, and directed backwards. The teeth which cover the gular surfaces of the branchial arches are more visible, and they are similar in form and larger on the pharyngeals, but even there they are not taller than the second and third rows on the jaws.\*

The front ray of the ventrals stands a little before the dorsal, and midway between the end of the snout and first anal ray. The tip of the pectorals reaches as far back as the first dorsal ray. The rays of the dorsal, anal and pectoral are connected at their bases to the body of the fish by small slips of membrane, which are represented in figure 1. The caudal is deeply forked.

There are about fifty-seven rows of scales between the gill-opening and caudal fin, and the scales of the lateral line are bent in the middle, so as to form a ridge, not very apparent anteriorly, but well marked, even and continuous, though not high on the tail. The scales generally are irregularly semicircular or semioval, the chord or base being divided by three furrows into four lobes, and the free margins, with the adjoining parts of the disk, being undulated (fig. 6). A scale from the lateral line (fig. 5) had only two furrows, with a short wide central tube. A range of more elongated scales flanks the dorsal and anal, and there are long pointed scales above and between the ventrals.

The colours have been effaced by maceration in spirits, but a series of small brown spots can still be traced on the upper caudal ray.

Length  $8\frac{1}{2}$  inches. Length of head 1·65 inch.

HAB. Coast of North-west Australia.

\* *Saurus nehereus* of Buchanan-Hamilton (*S. ophiodon*, Cuv.) has long, slender, hastate teeth on the branchial arches; and the fish which I have considered to be the *S. variegatus* of Commerson, in the 'Report on the Ichthyology of China,' has hastate mandibular teeth.

† *Saurus argyrophanes* wants this dental plate, but has four rows of palatine teeth.

\* *Salmo variegatus*, Commerson (Rich. Report, &c., p. 30) has very strong teeth on the tongue.





THE  
ZOOLOGY  
OF THE  
VOYAGE OF H.M.S. EREBUS & TERROR,

UNDER THE COMMAND OF CAPTAIN SIR JAMES CLARK ROSS, R.N., F.R.S.,  
DURING THE YEARS  
1839 TO 1843.

*BY AUTHORITY OF THE LORDS COMMISSIONERS OF THE ADMIRALTY.*

EDITED BY  
JOHN RICHARDSON, MD., F.R.S., &c.;  
AND  
JOHN EDWARD GRAY, Esq., Ph.D., F.R.S., &c.

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CRUSTACEA.

BY  
EDWARD J. MIERS, JUNIOR ASSISTANT, ZOOLOGICAL DEPARTMENT, BRITISH MUSEUM.

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LONDON:  
E. W. JANSON, 28, MUSEUM STREET, W.C.  
M.DCCC.LXXIV.



# CRUSTACEA.

By EDWARD J. MIERS, JUNIOR ASSISTANT, ZOOLOGICAL DEPARTMENT, BRITISH MUSEUM.

The greater number of the Crustacea here figured have been described by Mr. Adam White. The plates having been printed off many years since, and the stones destroyed, it has not been possible to alter their lettering, and bring it into correspondence with the nomenclature adopted in the text; but whenever I have adopted for any species a different generic or specific name from that used by Mr. White, and printed on the plate, a reference has been made to the latter in the synonymy of the species.

## DECAPODA BRACHYURA.

Sub-tribe MAIOIDEA, Dana.

*Wilke's U. S. Explor. Exped.* XIII., *Crust.* I., p. 66 (1852).

Genus XENOCARCINUS, White.

*App. Juke's Voy. H. M. S. Fly* (1847); *Proc. Zool. Soc.*, p. 119 (1847).

(*Huenioides*, Milne-Edwards, *Ann. Soc. Entom. de France*, (ser. 4) V. p. 144 (1865).

This genus is referred by Dana to his Family *Pericrada*, of which the distinctive characters are, the non-retractile eyes, and moderate legs, but it will probably be necessary in future systematic arrangements to unite this Family and the *Eurypodidae*, Dana, or to modify the characters, for the eyes are often slightly retractile in the *Pericrada*, and the genus *Oregonia*, placed by Dana in the *Eurypodidae*, has shorter legs than *Eurypodius*, approaching in this respect the genera of *Pericrada*.

The genus *Huenioides*, Milne-Edwards, is certainly synonymous with *Xenocarcinus*. It agrees with it in the narrow elongate form of the carapace and rostrum, in the eyes, antennae, and outer maxillipeds: also in having the beak covered with close short hair, and in the tarsi being finely denticulated below. *X. tuberculatus*, White, may be at once distinguished from *X. (Huenioides) conicus*, Milne-Edwards, l. c. p. 144, by its more oblong form, shorter, stouter rostrum, and strongly tuberculated carapace.

XENOCARCINUS TUBERCULATUS. *Tab. 2, fig. 1, a-c.*

*Xenocarcinus tuberculatus*, A. White, *Append. Juke's Voy. Fly*, p. 336 (1847); *Proc. Zool. Soc.*, p. 119 (1847); *List Crust. Brit. Mus.*, p. 123 (1847); A. & M. N. H. (ser. 2) I., p. 221 (1848).

Hab. Cumberland Group.

Type. B.M.

*Tab. 2, fig. 1.* Animal twice nat. size. 1a Side view of carapace and rostrum, nat. size. 1b Under surface, twice nat. size. 1c Outer maxiped. 1d Outer antenna. 1e Tarsus, all more enlarged.

In the British Museum there are five specimens (three male and two female) of a species of *Xenocarcinus*, which I believe is undescribed, and propose to call *Xenocarcinus depressus*, in allusion to its flattened carapace.

XENOCARCINUS DEPRESSUS, *sp. n.*

Carapace to base of rostrum, when viewed from above, regularly oval in outline; the uppersurface flattened. There are several small granules behind and between the eyes at the base of the rostrum, and irregular indistinct granulated elevations in the middle line, and on either side of the carapace, occupying nearly the same positions as the conical tubercles of *X. tuberculatus*. Rostrum subcylindrical, densely pubescent, terminating in two spines and deeply excavated between them. Eyes, antennae and outer maxillipeds as in *X. tuberculatus*. First pair of legs wanting in the females, in the males they are shorter than the

second pair, the palms of the hands oblong, smooth, the fingers short, slender, curved, touching only at the extremities when closed. Second pair of legs longer than any of the succeeding pairs. Tarsi stout, curved, spinulose beneath. Abdomen of male seven-jointed; of female very broad five-jointed, the three basal segments and the terminal segment free or nearly so, the intervening segments coalescing and much enlarged. Length of the largest female 1 inch, of the largest male  $\frac{3}{8}$  inch.

Hab. Cape Howe, Australia.

Type. B.M.

This species differs from the two mentioned above: in its broader carapace, stouter limbs, and cylindrical rostrum which is excavated at the end. The flattened granulations and tubercles are very different from the high conical tubercles of *X. tuberculatus*, the female abdomen of which is only three-jointed, all the segments coalescing, except a single basal and the terminal one.

#### Sub-tribe CANCROIDEA, Dana.

*U.S. Explor. Exped. XIII., Crust. I., p. 142 (1852).*

#### Genus NECTOCARCINUS, Milne-Edwards.

*Archiv. Mus. Hist. Nat. X., p. 404 (1861).*

#### NECTOCARCINUS ANTARCTICUS.

*Portunus antarcticus*, *Homb. & Jacq. Voy. Pole Sud. III., Crust. p. 51, tab. 5, f. 1 (1853)*; *White, List Crust. Brit. Mus., p. 25 (1847)*; *Zool. Erebus and Terror, tab. 1, f. 2 (1874).*

*Nectocarcinus antarcticus*, *Milne-Edw. Archiv. Mus. Hist. Nat. X., p. 407 (1861).*

Hab. South Seas.

B.M.

#### NECTOCARCINUS INTEGRIFRONS.

*Portunus integrifrons*, *Latr. Encycl. Méth. X., p. 192*; *Milne-Edwards, Hist. Nat. Crust. I., p. 445 (1834)*; *White, List Crust. Brit. Mus., p. 26 (1847)*; *Zool. Erebus and Terror, tab. 1, f. 3 (1874).* Young.

*Nectocarcinus integrifrons*, *A. Milne-Edw. Ann. Sci. Nat. (ser. 4) XIV., p. 220*; *Archiv. du Muséum X., p. 406, pl. 38 (1861).*

Hab. New Zealand; Australia, Port Jackson.

B.M.

The young specimens in the Museum vary much in the pubescence of the carapace, which is sometimes covered with hairs, at others, quite destitute of them, but they are all much smaller than the one figured by M. A. Milne-Edwards (*l.c.*) which is represented as quite glabrous.

#### NECTOCARCINUS TUBERCULOSUS.

*Nectocarcinus tuberculosus*, *A. Milne-Edw. Ann. Sci. Nat. (ser. 4) XIV., p. 220*; *Archiv. du Muséum X., p. 405, pl. 37 (1861).*

*Portunus integrifrons jun.*, *Zool. V. Erebus and Terror, tab. 1, f. 4 (1874).* Young.

Hab. Van Diemen's Land (*Young*).

B.M.

#### Genus PLATYONYCHUS, Latreille.

*Encycl. Méth. X., p. 152 (part.)*; *Bell, Brit. Crust., p. 83 (1853).*

It appears better to restrict the name *Platyonichus* to the species with a carapace broader than long, the tarsal joint of the fifth pair of legs broad, oval and rounded at the end; and elongated hands, *e.g.*, *Platyonichus ocellatus*, Herbst, and *P. bipustulatus*, Milne-Edwards, and to retain Dr. Leach's earlier name, *Portunus*, for the species with a carapace about as broad as long, an elongated, acute, lanceolate tarsal joint to the fifth pair of legs, and small hands, *Portunus latipes* (Pennant) Leach, *P. nasutus*, Latr., and *P. africanus*, A. Milne-Edw., as was first proposed by Professor Bell, *British Crustacea*, p. 83, but where the characters of the tarsi of the fifth pair of legs have been inadvertently transposed. M. Milne-Edwards, in the *Histoire Naturelle des Crustacés*, confounds Dr. Leach's original name *Portunus*, with *Portunus*, Fabr., and refers all the species to *Platyonichus*.

#### PLATYONYCHUS BIPUSTULATUS.

*Platyonichus bipustulatus*, *Milne-Edw. Hist. Nat. Crust. I., p. 437, pl. 17, f. 7-10, (1834)*; *White, List Crust. Brit. Mus., p. 24 (1847)*; *A. Milne-Edw., Archiv. du Muséum X., p. 413 (1861).*

*Portunus catharus*, *White, in. Dieffenb. New Zealand II., p. 264 (1843)*; *Zool. Erebus and Terror, tab. 1, f. 1 (1874).*

*Corystes (Anisopus) punctata*, *De Haan Faun. Japon. p. 44, pl. 2, f. 1 (1850).*

*Platyonichus purpureus*, *Dana, U. S. Explor. Exped. XIII., Crust. I., p. 291, pl. 18, f. 3 (1852).*

Hab. Australasia, Chili.

B.M.

The specimen figured is the type of *Portunus Catharus*, White, which M. A. Milne-Edwards, in his paper in the Archiv. du Muséum above quoted, rightly considers synonymous with *Platyonichus bipustulatus*, Milne-Edwards.

#### Genus CANCER, Linnaeus.

*Syst. Nat. I. 2, p. 1038 (1767)*; *Leach, Malac. Pod. Brit., tab. 10 (1815).*

*Platycarcinus*, *Latr., Milne-Edw., Hist. Nat. Crust. I., p. 412 (1834).*

#### CANCER NOVE-ZELANDIE.

*Platycarcinus novæ-zealandiæ*, *Lucas in Hombr. and Jacq. Voy. Pole Sud., p. 34, pl. 3, f. 6.*

*Cancer Novæ Zealandiæ*, *White, List Crust. Brit. Mus., p. 20 (1847)*; *Zool. Erebus and Terror, tab. 1, f. 5 (1874).*

*Cancer Novæ-Zelandiæ*, *A. Milne-Edw., Nouv. Archiv. du Muséum I., p. 189 (1865).*

Hab. New Zealand.

B.M.

This species is very probably identical with the *C. plebeius*, Poëppig, from Chili. The granulated ridges on the claws, and the shape of the teeth on the latero-anterior



margin vary much in the specimens in the Museum, from both localities, but M. A. Milne-Edwards in his monograph above quoted, considers the species distinct.

#### DECAPODA ANOMOURA.

Sub-tribe PORCELLANIDEA, Dana.

*U.S. Explor. Exped. XIII., Crust. I., p. 400 (1852).*

Genus PETROLISTHES, Stimpson.

*Proc. Acad. Nat. Sci. Philad. X., p. 227 (1858).*

#### PETROLISTHES ELONGATUS.

Porcellana elongata, *Milne-Edw., Hist. Nat. Crust. II., p. 251 (1837)*; *White, List Crust. Brit. Mus., p. 62 (1847)*; *Zool. Erebus and Terror, tab. 3, f. 3 (1874).*

Hab. New Zealand.

B.M.

Sub-tribe PAGURIDEA, Dana.

*U.S. Explor. Exped. XIII., Crust. I., p. 432 (1852).*

Genus PAGURUS, Fabricius.

*Ent. Syst. II., p. 468 (1793)*; *Milne-Edw.; Dana, U.S. Explor. Exped. XIII., Crust. I., p. 449 (1852).*

#### PAGURUS DEFORMIS.

*Pagurus deformis, Milne-Edw. Ann. Sci. Nat. (ser. 2) VI., p. 272; pl. 13, f. 4 (1836); Hist. Nat. Crust. II., p. 222 (1837).*

*Pagurus cavipes, White, Proc. Zool. Soc., p. 122 (1847); List Crust. Brit. Mus., p. 60 (1847); A. & M. N. H. (ser. 2) I., p. 223 (1848); Zool. Erebus and Terror, tab. 2, f. 3 (1874).*

*Pagurus cultratus, White, List Crust. Brit. Mus., p. 60 (1848).*

*Pagurus difformis, Dana, U.S. Explor. Exped. XIII., Crust. I., p. 449 (1852).*

Hab. Philippine Is.; Samoa; Australia; Bramble Key.

B.M.

I have no doubt from the figure and descriptions above quoted that *P. cavipes* and *P. cultratus*, White, are the same species as *P. difformis*, Milne-Edwards. The prominent ridge on the third left leg gives it an excavated appearance. I can find no characters by which to distinguish the single specimen of *Pagurus cultratus*, White, in the British Museum, from the Philippines, from the younger specimens of *P. cavipes*, from Australia. The largest specimen of *P. cavipes* (the one figured) has the larger hand more distinctly tubercular and granulated, and the tarsus of the third leg on the right side proportionately longer, but these peculiarities seem due to the age of the specimen. The figure badly represents the excavated tarsus of the third leg on the left side.

Genus EUPAGURUS, Brandt.

*Middendorff's Sibirische Reise Zool. I., p. 105 (1851).*

*Bernhardus, Dana, U.S. Explor. Exped. XIII., Crust. I., p. 440 (1852).*

#### EUPAGURUS COMPTUS.

*Pagurus comptus, White, Proc. Zool. Soc., p. 122 (1847); List Crust. Brit. Mus., p. 59 (1847); A. & M. N. H. (ser. 2) I., p. 224 (1848); Zool. Erebus and Terror, tab. 2, f. 5, 5a (1874).*

Hab. Falkland Islands.

Type. B.M.

Fig. 5, animal. 5a, hand enlarged.

Genus CLIBANARIUS, Dana.

*U.S. Explor. Exped. XIII., Crust. I., p. 461 (1852).*

#### CLIBANARIUS STRIGIMANUS.

*Pagurus strigimanus, White, Proc. Zool. Soc., p. 121, (1847); List Crust. Brit. Mus., p. 60 (1847); A. & M. N. H. (ser. 2) I., p. 224 (1848); Zool. Erebus and Terror, tab. 2, f. 4 (1874).*

Hab. Van Diemen's Land.

Type. B.M.

This species is very different in appearance from most of the genus, but agrees in the generic characters.

Sub-tribe GALATHEIDEA, Dana.

*U.S. Explor. Exped. XIII., Crust. I., p. 401 (1852).*

Genus MUNIDA, Leach.

*Dict. Sci. Nat. XVIII., p. 52.*

#### MUNIDA SUBRUGOSA.

*Galathea subrugosa, White, List Crust. Brit. Mus., p. 66 (1847); Zool. Erebus and Terror, tab. 3, f. 2 (1874).*

Carapace oblong, the sides slightly curved, the lateral margins with seven teeth. Front three-spined, the middle spine projecting considerably beyond the eyes, the lateral ones not quite half as long as the middle spine, and not projecting beyond the eyes. A second smaller spine behind each of the lateral frontal spines. A spine on either side of the middle line in the gastric region. Second third and fourth abdominal segments with a spine on either side of the middle line. The arms are now wanting in both the specimens in the Museum.

Hab. Auckland Islands, Reudezvous Cove. Type. B.M.

The specimens obtained in the U.S. Explor. Exped. at Terra del Fuego, and referred by Dana with doubt to this species (*U.S. Explor. Exped. XIII., p. 479, pl. 30, f. 7*) differ in the number and arrangement of the spines on the carapace, and the shape of the hands, and are no doubt specifically distinct.

Sub-tribe DROMIDEA ? Dana.

*U.S. Explor. Exped. XIII., Crust. I., p. 400 (1852).*

Genus CYMOPOLIA, Roux.

*Crust. de la Méditerranée (1827); Milne-Edw. Hist. Nat. Crust., p. 158 (1837).*

CYMOPOLIA JUKESII. Tab. 3, f. 4, 4 a-c.

*Cymopolia Jukesii, White, App. Jukes Voy. Fly., p. 338, pl. 2, f. 1 (1847); List Crust. Brit. Mus., p. 54 (1847).*

Hab. Torres Straits, Sir C. Hardy's Island. Type. B.M.

The true position of the genus *Cymopolia* is very doubtful. M. Milne-Edwards, in the Hist. Nat. Crust., considered it as intermediate between the *Dorippidae* and *Grapsidae*, but the square buccal opening (which however is imperfectly closed in front) is very different from that of the *Ocystomatata*, to which the *Dorippidae* belong. It has a great external resemblance to the *Grapsidae*, and, I think, should constitute a distinct group among the *Anomomura Grapsidea* in Dana's arrangement, although the articulation of the fourth joint of the outer maxillipeds is *Maioid* and not *Grapsoid* in character, as De Haan has shown (Faun. Japon., p. 113) on which account Dana placed the genus with the *Dromiidae* among the *Anomomura Maioides*, but he had not seen any specimens.

#### DECAPODA MACROURA.

Sub-tribe THALASSINIDEA, Dana.

U.S. Explor. Exped. XIII., Crust. I., p. 500 (1852).

Genus *GEBIA*, Leach.

Malac. Pod. Brit., tab. XXXI (1815).

*GEBIA* HIRTIFRONS. Tab. 3, fig. 5, 5a.

*Gebia hirtifrons*, White, Proc. Zool. Soc., p. 122 (1847); List Crust. Brit. Mus., p. 71 (1847); A. and M. N. H. (ser. 2) I., p. 225 (1848).

Hab. South Seas.

Sub-tribe ASTACIDEA, Dana.

U.S. Explor. Exped. XIII., Crust. I., p. 501 (1852).

Genus *PARANEPHROPS*, White.

Gray, Zool. Miscell. II., p. 79 (1842).

*PARANEPHROPS* PLANIFRONS. Tab. 3, fig. 1.

*Paranephrops planifrons*, White, Gray, Zool. Miscell. II., p. 79 (1842); Dieffenb., New Zeal. II., p. 267 (1843); List Crust. Brit. Mus., p. 72 (1847).

*Paranephrops tenuicornis*, Dana, U.S. Explor. Exped. XIII., Crust. I., p. 527, pl. 33, f. 4 (1852).

Hab. New Zealand.

Type. B.M.

There is a specimen named *P. tenuicornis* in the British Museum, from New Zealand, presented by the Smithsonian Institution, Washington, which appears to have been wrongly determined, for the rostrum is three-toothed on each side as in *P. planifrons*, whereas *P. tenuicornis* is described and figured by Dana as having four teeth on each side of the rostrum.

I have no doubt, however, that *P. tenuicornis* is identical with *P. planifrons*, or at most only a variety of it, for the number of teeth on the sides of the rostrum is liable to variation in the latter species, there being sometimes three on one side and four on the other, in the same specimen.

#### PARANEPHROPS ZELANDICUS.

*Astacus Zealandicus*, White, Proc. Zool. Soc., p. 123 (1847); List Crust. Brit. Mus., p. 72 (1847); A. and M. N. H. (ser. 2) I., p. 223 (1848); Zool. Erebus and Terror, tab. 2, f. 2 (1874).

Hab. New Zealand.

Type. B.M.

This species must be referred to *Paranephrops*. The antennary scales are not so much developed and the arms are not so elongated as in *P. planifrons*, but the hands are covered with spines, like those of the other species of the genus, and are very different from the smooth hands of *Potamobius* (*Astacus*), all the species of which inhabit the northern hemisphere. Moreover the supplementary abdominal legs which are characteristic of the males of *Potamobius* and some other genera, are absent in this, as well as in the other species of *Paranephrops*, in the British Museum.

Sub-tribe CARIDEA, Dana.

U.S. Explor. Exped. XIII., Crust. I., p. 501 (1852).

Genus *ALOPE*, White.

Proc. Zool. Soc., p. 123 (1847); List Crust. Brit. Mus., p. 75 (1847); A. and M. N. H. (ser. 2) I., p. 225 (1848).

*ALOPE* PALPALIS. Tab. 4, fig. 1.

*Alope palpalis*, White, Proc. Zool. Soc., p. 124 (1847); List Crust. Brit. Mus., p. 75 (1847); A. and M. N. H. (ser. 2) I., p. 226 (1848).

Hab. New Zealand.

Type. B.M.

*ALPHEUS*, Fabricius.

Ent. Syst. Suppl., p. 404 (1798); Milne-Edwards, Hist. Nat. Crust. II., p. 349 (part.); Dana, U.S. Explor. Exped. XIII., Crust. I., p. 534.

\* Beak linear, rising from front margin of carapace. (Inferior margin of larger hand notched at base of finger. Orbits over eyes entire. Fingers of smaller hand not longer than the hand itself.)

*ALPHEUS* EDWARDSII.

*Alpheus Neptunus*, White, List Crust. Brit. Mus., p. 74 (1847); Zool. Erebus and Terror, tab. 4, f. 3 (1874).

*Athanasus Edwardsii*, Audouin, in Savigny Deser. de l'Egypte, pl. 10, f. 1; not *Alpheus Edwardsii*, Milne-Edwards, Hist. Nat. Crust. II., p. 352; Dana, U.S. Explor. Exped. XIII., Crust. I., p. 542, p. 34, f. 2.

Carapace more inflated than in *Alpheus strenuus*. Hand larger, similar to that of *A. strenuus*, but the fingers are narrower compared with the palm. The first joint of the carpus of the second pair of legs is longer than the second, the second joint longer than either the third or fourth and about as long as the fifth joint. The smaller hand is wanting.

The *Alpheus Neptunus* described by Dana, U.S. Explor. Exped. XIII. Crust. I., p. 553, pl. 35, f. 5, has a three-

spined front, like that of *Alpheus minus*, Say, and has nothing to do with the *Alpheus Neptunus* of White.

Hab. Port Essington.

B.M.

#### ALPHEUS STRENUUS.

*Alpheus Doris*, *White, List Crust. Brit. Mus.*, p. 75 (1847); *Zool. Erebus and Terror*, tab. 4, f. 2 (1874).

*Alpheus Rhode*, *White, List Crust. Brit. Mus.*, p. 75 (1874).

*Alpheus strenuus*, *Dana, U.S. Explor. Exped.* XIII., *Crust.* I., p. 545, pl. 34, f. 2 (1852).

Larger hand hairy, especially towards the fingers, with a longitudinal groove above on the inner surface close to the upper margin and an oblique groove on the outer surface of the palm. Smaller hand opening nearly horizontally, the outer (moveable) finger flattened, with an oblique ridge at its base on the outer surface, the margins thickly ciliated. The two first joints of the carpus of the second pair of legs equal in length and each longer than either of the three following joints.

Hab. Philippine Islands. Torres Straits.

B.M.

#### ALPHEUS GALATHEA. Tab. 4, fig. 4.

*Alpheus Galathea*, *White, List Crust. Brit. Mus.*, p. 75 (1847).

Hab. Port Essington.

Type. B.M.

#### ALPHEUS ALOPE. Tab. 4, fig. 6.

*Alpheus Alope*, *White, List Crust. Brit. Mus.*, p. 75 (1847).

Hab. Australia, Port Stephen.

Type. B.M.

The types of *Alpheus galathea* and *Alpheus alope* in the British Museum belong to this section of the genus, but are in too bad a condition to be distinctively characterised.

\*\* Beak triangular, rising behind the front margin of the carapace. (Orbits with spines over the eyes.)

#### ALPHEUS DOTO. Tab. 4, fig. 5.

*Alpheus Doto*, *White, List Crust. Brit. Mus.*, p. 75 (1847).

Rostrum narrow, triangular, scarcely projecting beyond the front of the carapace. Upper margins of the orbits with a minute spine. Hands (in the figure, the left hand is now wanting in the type) similar, the left the smallest. Right hand smooth, with scattered yellowish hairs, the lower margin straight entire, the upper convex. Fingers very small. The first joint of the carpus of the second pair of legs longer than the second, the second joint about as long as the third and fourth together.

Hab. Sir C. Hardy's Island.

Type. B.M.

#### ALPHEUS THETIS. Tab. 4, fig. 7.

*Alpheus Thetis*, *White, List Crust. Brit. Mus.*, p. 75 (1847).

Hab. New Holland.

Type. B.M.

The specimens of this species in the British Museum are in too imperfect a condition to be well distinguished from other species of the same section of the genus. The hands are wanting. The beak projects beyond the front margin of the carapace; the first joint of the carpus of the second pair of legs is longer than any of the succeeding. In these respects *A. thetis* resembles the *Alpheus lacris*, Randall, Journ. Acad. Nat. Sci. Philad. VIII., p. 141, figured by Dana, U.S. Explor. Exped. Crust. pl. 35, fig. 8, with which it may be identical.





THE  
ZOOLOGY  
OF THE  
VOYAGE OF H.M.S. EREBUS & TERROR,  
UNDER THE COMMAND OF CAPTAIN SIR JAMES CLARK ROSS, R.N., F.R.S.,  
DURING THE YEARS  
1839 TO 1843.

*BY AUTHORITY OF THE LORDS COMMISSIONERS OF THE ADMIRALTY.*

EDITED BY  
JOHN RICHARDSON, M.D., F.R.S., &c.;  
AND  
JOHN EDWARD GRAY, Esq., Ph.D., F.R.S., &c.

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INSECTS.  
BY  
ADAM WHITE, M.E.S., &c.,  
AND  
ARTHUR GARDINER BUTLER, F.L.S., F.Z.S., &c.

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LONDON:  
E. W. JANSON, 28, MUSEUM STREET, W.C.  
M.DCCC.XLVI.—M.DCCC.LXXIV.









# INSECTS.

## 1.—INSECTS OF NEW ZEALAND.

THE following catalogue contains a list of the insects hitherto recorded as having been found in New Zealand and the Auckland Islands, to which is added a description of the new species brought home by the officers of the Expedition, and of others since obtained from Dr. Sinclair, Mr. Earl, and other persons, and are either contained in the collection of the British Museum or in those of Capt. Parry and W. W. Saunders, Esq., who have kindly placed their collections at our disposal for the purpose of their being described and figured.

### Family CICINDELIDÆ.

#### CICINDELA TUBERCULATA.

*Cicindela tuberculata*, *Fabr. Syst. Eleuth.* I. 238, 32  
*Oliv. t. 3 f. 28.* *Dejean. spec. gen.* II. 431. *Guerin. Voy.*  
*Coquille t. 1. f. 4*

Subcylindrical, obscure bronze. Elytra spotted with green; shoulder and base of the side of elytra with a yellowish lunule, connected at the end with a spot in the middle, forming a transverse band, which extends nearly to the suture and is bent downwards at the end; on the outer edge it is dilated, especially towards the upper lunule; at the lower part it is but slightly attached to the terminal lunule of elytra, which is narrowest in the middle; the other parts of elytra are of a blackish purple, with many minute greenish dots; an interrupted line on each elytron near the suture of larger spots; scutellum with the sides nearly straight.

Hab. New Zealand.

#### CICINDELA DOUEI.

*Cicindela Douei*, *Chenu. Guerin Mag. de Zool.*, 1840,  
*t. 45.*

Elongated, bronzed above; labium and mandibles on the sides yellow; thorax quadrate, somewhat flattened, deeply impressed with two transverse bluish furrows; ely-

tra with anterior margin, lunules on shoulder and subapical point, yellow. Body beneath greenish blue, with white hairs.

Hab. New Zealand.

#### CICINDELA LATE-CINCTA. Pl. 1. f. 1.

Elytra bordered all round with a whitish yellow band, which extends close to the edge; the inner edge has four slight sinuosities and three lobes, the middle one largest, forming a shortish band, not quite reaching to the suture. Head, thorax and rest of elytra of a dark, bronzy brown. Elytra much elongated.

Length 7 lines.

Hab. New Zealand (Waikouaiti), Mr. Earl.

#### CICINDELA PARRYI. Pl. 1. f. 2.

Obscure bronze; elytra with a slight isolated lunule on the basal edge of a pale yellow, with many brown dots, a whitish line on the margin next to this, from the front of which a sharpish spot directed backwards does not nearly attain the suture. This, and a wide, straightish spot at the end of the elytra are pale yellow, thickly dotted with brown, rest of elytra of a bronzy hue, very much pustuled, with many largish, irregularly placed greenish spots, and two deep velvet-like, somewhat sagittate marks near the suture; scutellum large, with the sides rounded, antennæ with the first joint green, the other joints ferruginous, from the 2nd

to the 4th paler; head narrowish; thorax with the two lobes forming upper part not so distinct as in *C. tuberculata*, tibiae and tarsi paler than in *C. tuberculata*; the elytra also are wider and less long than in that species.

Length, 5 to 5½ lines.

Hab. New Zealand (Port Nicholson), Capt. Parry. Mus. Brit., from Mr. Earl's collection.

#### Family CARABIDÆ.

##### CYMINDIS DIEFFENBACHII.

*Cymindis Dieffenbachii*, White. *Dieff. New Zeal.* II. 273.

*C. anstralis*, Hombr. and Jacq., *Voy. au Pole Sud.* t. 1. f. 7.

Of a brownish black, with the antennæ and legs tawny; the *C. australis*, *Def. Spec. Gen.* II. 449, is a very different insect, distinguished from this by its size, colour and form; it is a native of Port Jackson.

Hab., New Zealand (Otago), Hombron and Jacquinot.

##### LEBIA BINOTATA.

*Lebia binotata*, Hombron and Jacq., *Voy. au Pole Sud.* t. 1. f. 8.

Head and elytra of a deep brown, each of the latter with a longish testaceous spot, widest in the middle; thorax, antennæ and legs rufo-testaceous; apex of elytra very slightly tinged with testaceous; elytra have several slightly raised lines.

Length, 3 lines.

Hab., New Zealand, (Port Nicholson and Waikouaiti).

##### DEMETRIDA, White.

Head as wide as thorax, narrowed behind the eyes, which are very prominent; last joint of the palpi oval and pointed; thorax longer than wide, narrower than elytra, straight in front, gradually rounded and narrowed at the end; side margined, a deep groove down the middle; elytra narrow at base, gradually wider towards the end, flattened above; abdomen considerably longer than elytra; tarsi with the claws small and serrated on the edge; first three joints triangular, fourth joint strongly bilobed.

##### DEMETRIAS (DEMETRIDA) LINEELLA, Pl. 1. f. 3.

Head smooth, but somewhat rugose in front of eyes, with the antennæ and cibarial organs testaceous, behind the eyes brownish; thorax testaceous, sides of it above with a brownish band and finely striated across; thoracic groove in front divided into three; elytra testaceous, with nine longitudinal punctato-striated lines, some of them connected at base and tip; a longish brown line near the outer margin of each elytron; one or two spots near the end of two or three of the inner striæ; legs and under side testaceous.

Length, 4 lines.

Hab., New Zealand (Port Nicholson), Mus. Parry.

##### DEMETRIDA NASUTA.

Head produced in front, with the antennæ rufo-testaceous; thorax rufo-fuscous; groove down the middle, simple in front, the upper part with many delicate transverse striæ; elytra rather deeply striated, deep fuscous; longish spot on each shoulder; narrow side margin of each elytron, and oblique spot at the tip of each serrated above, of a yellowish colour; under side deep brown; legs yellowish.

Length, 3 lines.

Hab., New Zealand. Mus. Parry.

##### DROMIUS FOSSULATUS.

*Dromius fossulatus*, Hombr. and Jacq., *Voy. Pole Sud.* t. 3. f. 16.

Hab., New Zealand (Akaroa).

##### ACTENONXYX. White.

Head nearly as wide as the thorax, with large, but not very prominent eyes; antennæ longish, with oblong joints; thorax nearly as wide as long, straightish in front, and behind, where it is slightly narrowed; elytra very wide and depressed, obliquely truncated at the end; tarsi with claws slender and not serrated; a genus in form approaching *Calleida*.

##### ACTENONXYX BEMBIDIROIDES.

Entirely bronzed; head and thorax greenish; elytra with longitudinal shallow striæ; some of striæ near suture with two or three punctures; sides of head striated, in the middle quite smooth; two or three short rufescent hairs above the eyes; thorax finely striated on the sides of the groove.

Length, 4 lines.

Hab., New Zealand.

##### COLPODES SUBMETALLICUS.

Bronzy brown; thorax with the side margins yellowish; the side margins of elytra very slightly yellow; Head in front, with the sides with two deepish longitudinal impressions; the edge slightly recurved, scarcely grooved in the middle; elytra with straight grooves not punctured; the 2nd groove (from the suture), near the end with a transverse, very short impressed line on the outside; near the margin a row of impressed points, closest near the end; an impressed point near the end of 7th striæ; legs yellowish; antennæ brownish; under side of abdomen greenish.

Length 4½ lines.

Hab., New Zealand.

##### PRISTONYCHUS CASTANEUS.

*Pristonychus castaneus*, Hombr. and Jacq. *Voy. au Pole Sud.* t. 2. f. 1.

Hab., Auckland Islands.

## PRISTONYCHUS BREVIS.

*Pristonychus brevis*, Hombr. and Jacq., *Voy. au Pole Sud*, t. 2, f. 2

Hab., Auckland Islands.

## CALATHUS RUBRO-MARGINATUS.

*Calathus rubro-marginatus*, Hombr. and Jacq., *Voy. au Pole Sud*, t. 2, f. 3.

Hab., Auckland Islands.

## ANCHOMENUS ELEVATUS.

*Anchomenus elevatus*, Parry, *Mss.*

Head in front, with a very obscure impression on one side; antennæ and palpi ferruginous; thorax with a deepish groove down the middle, not reaching the fore or hind margin; the side-margin hollowed out, and a longish bent groove on each side behind, fading away in front; elytra with the grooves very deep; 3rd and 4th, and 5th and 6th connected at the end; between the 8th and 9th a row of impressed points, closest behind; tibie and tarsi slightly ferruginous.

Length, 6½ lines.

Hab., New Zealand (Port Nicholson)

## ANCHOMENUS (CTENOGNATHUS) NOVE ZEELANDIE.

*Anchomenus (Ctenognathus) Novæ Zealandiæ*, L. Fairm. *Ann. Soc. Ent.*, 1843, 12.

Wingless, black, carapace cordate, grooved; margin somewhat reflexed; elytra ovate, striated; antennæ, palpi and tarsi of a pitchy red.

Length, 5¾ lines.

Hab., New Zealand, Bay of Islands.

## ANCHOMENUS COLENSONI.

Head with very slight grooves in front, very smooth behind; antennæ of a brownish yellow, the first joint palest; thorax in the middle, with three grooves, the outer curved; head and thorax of a deep brown, the latter ferruginous; angle of thorax behind quite smooth; elytra very much depressed, with very distinct longitudinal striae, third and fourth and fifth and sixth united at the end; between the eighth and ninth is a row of impressed points; they are of a reddish brown; the legs are of a pale yellow.

Length, 5¾ lines.

Hab., New Zealand,—Colenso Esq.

## ANCHOMENUS DEPLANATUS.

Head and thorax shining black; elytra dull black; head with some rather large impressed points on the sides in front, and a transverse impressed line behind the eyes; thorax in the middle, behind and in front with many close striae, placed longitudinally; a deepish groove in the middle and two very distinct, longish fossæ behind, one on each side; elytra above depressed; the grooves not very deep; the second, seventh and eighth bent at the end; a row of dots near the margin; legs black; tarsi reddish.

Length, 5 lines.

Hab., New Zealand, Capt. Parry.

## ANCHOMENUS ATRATUS.

*Anchomenus atratus*, Hombr. and Jacq., *Voy. au Pole Sud*, t. 1, f. 15.

Hab., New Zealand, Hombron and Jacquinet.

## FERONIA (PLATYSMA) PLANIUSCULA. Pl. 1 f. 7.

Very deep black; the palpi deep ferruginous; fourth to eleventh joints of antennæ covered with short brown hairs; front part of head above with an H-shaped impressed mark; thorax with a transverse, impressed line in front; another down the middle, deepest behind; two very deep, impressed spots near the posterior angles, from each of which proceeds a ferruginous hair; elytra with seven longitudinal, straight punctured striae; the lateral deepest; the space between each very flat and smooth, except behind, where each is narrowed and raised; the striae there being widened and more coarsely punctured; the sides of elytra rather deeply sunk and with a row of ctenulate points; hairs on tibie and tarsi ferruginous.

Length, 12½ to 13 lines.

Hab., New Zealand (Wellington) Capt. Parry, Mus. Brit. ♂ var. Mr. Earl.

## FERONIA (PLATYSMA) VIGIL.

Very deep black; hairs on antennæ, tibie and tarsi ferruginous; head and thorax very delicately and irregularly striated; head with an H-shaped impressed mark in front; thorax with an impressed, transverse, somewhat bent line in front; a straight one down the middle, deepest behind, but not reaching the posterior margin; two deep impressions near the posterior angle of thorax; elytra short, with seven longitudinal striae, the spaces between slightly raised; the lateral margin depressed with a ctenulate row of points.

Length, 10½ lines.

Hab., Port Nicholson, New Zealand. Capt. Parry.

## FERONIA (PLATYSMA?) AUSTRALASIE.

*Feronia (Platysma?) Australasiæ*, Guerin *Rev. Zool. Cur.* 1841, 121.

*Abax Australasiæ*, Hombr. and Jacq., *Voy. au Pole Sud*, t. 2, f. 13.

Obscure bronze colour above, black beneath; head smooth, with two feeble impressions in front between the antennæ; palpi elongated, with the last joint quite cylindrical and somewhat obliquely truncated at the end; antennæ with four first joints smooth and black, the others hairy and brownish towards the end; thorax somewhat flattened, wider than the head, smooth, margined; contracted and somewhat sinuated behind; very slightly notched on the hind margin, with a longitudinal groove in the middle and a large fossa on each side behind; scutellum triangular, much wider than long, with longitudinal wrinkles at the base; elytra rather wider than the thorax, at their base slightly widened; rounded on the sides towards the middle; very feebly sinuated towards the end; each has nine punctured striae, the spaces between considerably raised; two or three large impressed points between the second and third, fourth and fifth and sixth and

seventh striae; eighth and ninth are not distinct, and furnished with large, deep points, which end at the outer border; beneath smooth; legs black, strong, spiny.

Length, 10 lines.

New Zealand. Mus. Brit. Parry.

*FERONIA (PLATYSMA) ? SUBÆNEA.*

*Feronia (Platysma) ? subænea*, *Guerin, Rev. Zool. Cuv.* 1841. 122.

Slightly bronzed black above, deep black beneath; body elongated, nearly parallel; head smooth, with two short, slight impressions in front; thorax nearly as long as wide, somewhat cordate, smooth, margined, with a longitudinal median groove, slightly widened behind, and not reaching the hind margin, or rather wide fossa near the hind angles; scutellum triangular, somewhat wider than long, with four or five longitudinal grooves at the base; elytra wider than the thorax behind; nearly twice as long as wide; rather strongly sinuated behind, the side slightly rounded; each has eight striae of large elongated points, connected, and forming short grooves in different parts; the spaces between slightly raised; the spaces between the second and third, fourth and fifth, sixth and seventh striae are wider and more raised; the points forming the eighth stria are much larger and more distant; legs are black and strong.

Hab., New Zealand.

*FERONIA (PLATYSMA) CAPITO.*

Head nearly as wide as the thorax, with two rather long, deep impressed lines on front between antennae, with the joints from the fourth to the eleventh hairy; thorax with a very distinct, transverse, impressed line in front, and at the end of the middle longitudinal thoracic line; head and thorax with a greenish line, strongest on the margins and posterior angles of thorax; elytra with a very few scattered, longish hairs; elytra with a greenish hue, marked similarly to *F. Australasie*; the sides of elytra somewhat angulated instead of being flat as in that species.

Length, 8½ to 9½ lines.

Hab., New Zealand.—Colenso Esq.

A species allied to *F. Australasie*, but distinguished readily by the size of its head, narrower thorax, colour and hairs on elytra; the insect also is somewhat smaller; both of these come near the genus *Omalosoma* of Hope.

*FERONIA (PLATYSMA) POLITISSIMA.*

Very deep black; head with an H-shaped impression in front; thorax with two deep, somewhat curved fossae behind, one on each side; elytra with very deep, longitudinal punctured striae, the fifth and sixth united at the end; side with a row of catenulate punctures.

Length, 6 lines.

Hab., New Zealand (Port Nicholson), Mr. Earl.

*FERONIA (PTEROSTICHUS) VAGEPUNCTA.*

Deep black; head with two deep, impressed lines in front; thorax with a longitudinal line down middle, ending both before and behind in a deepish fossa; behind

on each side a deep fossa connected with the hind margin; elytra with longitudinal striae marked with somewhat interrupted, longish impressions.

Length, 7 to 8 lines.

Hab., New Zealand (Port Nicholson), Mr. Earl.

*FERONIA (COPHOSUS) ELONGELLA.*

Head with an H-shaped impression in front; thorax slightly convex, with a very deep, pyriform impression on each side; a deep groove, distinctly striated across, and ending in a deepish fossa both in front and behind; elytra rather convex; considerably sinuated on the outside at the end; longitudinally striated, the striae with interrupted punctures, especially behind.

Length, 6½ lines.

Hab., New Zealand, Capt. Parry.

*OMASEUS SYLVATICUS.*

*Omascus sylvaticus*, *Hombr. and Jacq. Voy. au Pole Sud. t. 2. f. 5.*

Hab., New Zealand (Akaroa).

*ARGUTOR PANTOMELAS.*

*Argutor pantomelas*, *Homb. and Jacq. Voy. au Pole Sud. t. 2. f. 6.*

Hab., New Zealand (Akaroa).

*ARGUTOR ERYTHROPUS.*

*Argutor erythropus*, *Hombr. and Jacq. Voy. au Pole Sud. t. 2. f. 7.*

Hab., New Zealand (Akaroa).

*ARGUTOR PICEUS.*

*Argutor piceus*, *Hombr. and Jacq. Voy. au Pole Sud. t. 2. f. 8.*

Hab., New Zealand (Akaroa).

*BROSCUS CARENOIDES.* Pl. 1. f. 6.

Very deep black; head in front, near the base of mandibles with two or three deep punctures on each side; thorax very narrow behind and transversely grooved; a slight, straight stria down the middle, across irregularly striated; on the lateral margin are some points, from which proceed longish, reddish hairs; elytra smooth, with very faint indications of grooves, which behind are more distinct; the spaces between somewhat granulated; two or three punctures on the shoulders of the elytra, with reddish hairs in them; one or two very distant points on the elytra from the shoulder to the tip of elytra; femora and palpi rufescent.

Length, 13½ lines.

Hab., New Zealand, Capt. Parry.

The greater part of the legs and antennae are broken off in the specimen described. In the Museum collection there is a closely allied species from Australia.



BROSCUS (PROMECODERUS?) ÆREUS. Pl. 1. f. 8.

Head above in front of the eyes with several bent striae; thorax very convex above, gradually narrower behind, a few distant, longish hairs on the margin, a deepish groove down the middle, not reaching to the fore or hind margins, in front, on each side before its termination is a slight, transverse line, a very slight point near each of the hind angles; scutellum not visible; elytra together of a longish oval, slightly striated, the striae with rather distant punctures, near the edge is a row of rather larger punctures; tibiae and tarsi with a few deep ferruginous hairs.

Length, 9 lines.

Hab. New Zealand (Port Nicholson).

PROMECODERUS LOTTINI.

Promecoderus Lottini, *Brullé, Hist. Nat. Insectes*, IV. 450, t. 18, f. 4.

Hab. New Zealand.

MECODEMA SCULPTURATUM.

Mecodema sculpturatum, *Hombr. et Jacq. Voy. au Pole Sud*, t. 2, f. 14.

Hab. New Zealand (Otago).

HETERODACTYLUS, Guérin.

Labrum transverse, entire; mandibles not very prominent, bent, without teeth on the inside, much widened at the base and having on the outer side a wide fossa which receives the first joint of antennae; palpi elongated, filiform, last joint cylindrical and scarcely swollen in the middle, obliquely truncated at the end; mentum with the notch wide, in the middle with a rounded projection; tongue wide, very prominent between the labial palpi; antennae filiform; anterior tibiae strongly notched beneath only, with the four first joints of the tarsi strongly dilated in the males, rounded on the sides, much contracted behind and very distinctly cordate, the fourth having the inner lobe much more elongated than the outer; intermediate tarsi with triangular joints not so much dilated as the anterior, but wider than those of hind legs; these four tarsi have their fourth joint much prolonged on the outer side; thorax cordate; body apterous.

HETERODACTYLUS NEBRIOIDES.

Heterodactylus nebrïoides, *Guérin, Rev. Zool. Cur.* 1841, 214.

Shining black; head smooth, with two wide fossae in front; mandibles with one tooth, margins widened, reddish and slightly transparent; antennae longer than the head and thorax, the four first joints smooth and shining, the second shortest and the others downy; thorax cordate, truncated in front and behind, smooth, finely margined with a longitudinal groove in the middle, a feeble transverse impression in front and two rather deep fossae behind, near the hind angles; scutellum rounded, slightly rugose; elytra oval, of the width of thorax at base, without

humeral projections, feebly margined, widest in the middle, smooth, and with nine striae, distinct on the disk but nearly obliterated on the sides; these striae do not all reach the end, the second, especially, stops a little beyond the middle, and on the outer margin are some impressions most marked behind; beneath and legs smooth.

Length,  $7\frac{1}{2}$  to 8 lines.

Hab. Auckland Islands.

HELEOTRECHUS, White

Head much wider than thorax; eyes very large and prominent; thorax in front rounded, the anterior angles rounded, behind narrowed; elytra rather wider behind than in front, behind obliquely truncated; antennae short, somewhat hairy. One of the Subulpalpi with truncated elytra in general appearance with a considerable resemblance to Scopodæ boops, one of the Pericaliidæ, described by Erichson, *Arch.* 1842, p. 123, t. 4, f. 1.

HELEOTRECHUS ELAPHROIDES, Pl. 1, f. 5.

Head longitudinally striated between the eyes; thorax with a short groove down the middle, not extending to hind edge; elytra with large, coarse, irregular punctures: the insect is of a deep black; legs yellow; middle of femora and the tips with a brownish band.

Length,  $2\frac{1}{2}$  lines.

Hab. New Zealand (marshes), Dr. Hooker.

OPTERUS, Guérin.

Palpi ending in a conical joint, which is sharp at the end; the penultimate joint of maxillary palpi as long as the last; four first joints of anterior tarsi dilated in the males, the two first joints wider, somewhat elongated on the inner side; antennae short, submoniliform, with the last seven joints scarcely longer than wide; body thick, oval.

OPTERUS CLIVINOIDES.

Opterus clivinoïdes, *Guérin, Rev. Zool. Cur.* 1841, 123. *Hombr. et Jacq. Voy. au Pole Sud*, t. 2, f. 16.

Of a deep shining brown colour; head oblong, narrower than the thorax, smooth, with two wide longitudinal grooves between the insertion of antennae about twice the length of the eyes; antennae and palpi yellowish brown; thorax convex, cordate, finely margined, smooth, with slight, transverse, short striae towards the sides and hind margin; groove in middle of thorax indistinct; on each side, near the hind angles, a short and rather wide fossa, and in the middle of hind margin some short, longitudinal striae; scutellum very small, triangular; elytra at least twice the width of thorax, about the middle much arched, forming a short oval, smooth and shining, with longitudinal, very feebly punctured striae, the spaces between flattened, the side stria almost effaced; margins of elytra and suture of a somewhat fulvous brown, especially behind, black beneath; legs of a brownish, fulvous yellow.

Hab. Auckland Islands.

## OPTERUS PLICATICOLLIS.

*Oopterus plicaticollis*, *Hombr. and Jacq., Voy. au Pole Sud*, t. 2, f. 15.

Hab. Auckland Islands.

## OPTERUS ROTUNDICOLLIS.

Thorax rounded, without any groove, near the posterior margin depressed and closely punctured; elytra with superficial striae formed by rows of closely placed points; whole insect of a pitchy brown; the palpi and legs of a lighter colour.

Length,  $2\frac{1}{2}$  lines.

Hab. New Zealand (Bay of Islands), Dr. Sinclair, Chas. Darwin, Esq.

## MOLOPSIDA, White.

Head large; last joint of palpi sharp-pointed; antennae with the joints somewhat moniliform and bristly; thorax without margin, much wider behind than in front, sides considerably rounded, behind quite straight, the posterior angles nearly rectangular; elytra ovate, truncated in front, considerably convex.

## MOLOPSIDA POLITA.

Deep, shining black; elytra with longitudinal rows of shallow striae rather closely punctured, the margin with two deep grooves connected in many places by short, transverse grooves; antennae and palpi ferruginous; legs deep rufous.

Hab. New Zealand (Waikouaiti), Mr. Earl.

## Family STAPHYLINIDÆ.

## STAPHYLINUS OCVLATUS.

*Staphylinus oculatus*, *Fab. Ent. Syst.* II. 521, 10. *Boisd. Voy. Astrol.* II. 54, t. 9, f. 1 *Erichson, Staph.* 352.

Entirely of a deep, smooth, shining black; head on each side with a large fulvous spot, forming a band on the under side of head.

Hab. New Zealand.

## STAPHYLINUS (GYROHYPNUS?) QUADRI-IMPRESSUS.

Black; elytra somewhat brown; head very large, square, with two deep points between the eyes; antennae with first joint very long, clubbed at the end, third joint very narrow at the base; thorax somewhat narrowed behind, rounded in front, with two deepish points; elytra and abdomen above finely punctured; wings shaded with brown.

Length, 6 lines.

Hab. New Zealand.

## STAPHYLINUS (CAFIUS) PUNCTICEPS.

Head on the sides behind the eyes and on the back part coarsely punctured, two large dots between the eyes; head and thorax with some scattered, longish hairs; thorax with two longitudinal lines of impressed dots; elytra

minutely punctured and covered with short hairs; head and thorax black; elytra, abdomen and legs brownish.

Length, 4 lines.

Hab. New Zealand,—Colenso, Esq.

## Family DYTICIDÆ.

## CYBISTER HOOKERI.

Front of head with two impressed dots; thorax behind with a band of short, closely placed striae, and a few dots along the front and close to the margin; outer margin of elytra with many impressed dots and three distant rows of dots on the back of the elytra, the dots far from each other, especially on the two outside rows; clypeus and front of head yellow; lateral margin of thorax and elytra yellow, the yellow reaching the outer edge, other parts of a very deep olive-brown; some ferruginous-brown on two fore legs; antennae ferruginous and brown mixed.

Length, 12 lines, greatest width,  $6\frac{1}{2}$  lines.

Hab. Hutt River, Port Nicholson.

## COLYMBETES NOTATUS.

*Dytiscus notatus*, *Fabr. Ent. Syst.* I. 195, 38.

Brown; thorax yellowish, with four black points and sometimes an abbreviated black band; sutural stria of elytra yellow, margin of elytra yellowish.

A specimen of *Colymbetes* from New Zealand in the collection of Mr. Saunders exactly agrees with a British example of the above-named species in the Museum collection.

## COLYMBETES RUFIMANUS.

Head narrow, between the eyes black, with a transverse reddish line; clypeus reddish; thorax reddish, with a lozenge-shaped black spot in the middle; elytra yellowish, thickly spotted with brown, margin without spots, suture brownish, with a narrow yellow line on each side; underside deep blackish brown; two first pairs of legs light rufous.

Length,  $5\frac{1}{2}$  lines, breadth, 3 lines.

Hab. New Zealand.

This species comes near *C. pacificus*, *Boisd. Voy. Astrol.* 50. *Aubé. Spec. Gen. Hydroc.* VI. 268.

## Family BUPRESTIDÆ.

## BUPRESTIS (TRACHYIDES) EREMITA.

Head, thorax and elytra very closely punctured and slightly downy; green, sometimes with a coppery hue; thorax in front with the sides slightly compressed.

Length,  $2\frac{1}{2}$  lines.

Hab. New Zealand (Port Nicholson).

This small *Buprestis*, the only representative of the family that I have seen from New Zealand, resembles much in form the Australian genus *Diphucrania*. The head, however, is not notched in front.

## Family ELATERIDÆ.

ELATER ACUTIPENNIS. *Pl. 1, f. 9.**Elatér acutipennis, Parry, MSS.*

Head with a triangular impression between the eyes, and slightly punctured; thorax with the sides above hollowed out, with greyish hairs, the posterior angles large and sharp, the hind edge lobed in the middle, just before the scutellum; elytra gradually tapering to the end, with four longitudinal, wide vittæ, sparingly covered with greyish hairs; whole insect of a rich, deep brown; the extreme tip of elytra ferruginous; underside of body and legs sparingly covered with greyish hairs.

Length, 9 to  $11\frac{1}{2}$  lines.

Hab. New Zealand (Port Nicholson).

## ELATER (LIMONIUS) ZEALANDICUS.

Head, thorax and elytra brownish black, finely punctured; the elytra with nine rows of punctured striæ on each, the marginal row deepest.

Length,  $8\frac{1}{2}$  to  $10\frac{1}{2}$  lines.

Hab. New Zealand (Port Nicholson).

## ELATER APPROXIMANS.

Head having the clypeus with two deep impressions; thorax finely punctured; each of the sides with a wide row of grey hairs placed in a slight depression; elytra sulcato-striated, gradually tapering to the end; thorax dull brown; elytra ferruginous brown.

Length,  $7\frac{3}{4}$  lines.

Hab. New Zealand.

## ELATER LINEICOLLIS.

*Elatér lineicollis, Parry, MSS.*

Reddish ochrey, with a brown line down the middle of thorax; head somewhat depressed between the eyes, brown, yellowish in front, with ochrey hairs; antennæ brown; thorax dotted, with an impressed line down the middle and a few short ochrey hairs; elytra rather deeply punctato-striate; side of antennal thoracic groove and the margin of metathorax black.

Length, 5 lines.

Hab. New Zealand (Port Nicholson).

ELATER CINCTIGER. *Pl. 1, f. 11.*

Deep reddish brown; the side margins of thorax and elytra with a wide yellow band; head punctured, with two shallow impressions in front; thorax elongated, rich brown, shining, closely punctured, a wide yellow band on each side free from dots; elytra elongated, attenuated gradually to the end, ferruginous brown, punctato-striated, a wide yellow line near the margin of each; underside rufous brown.

Length, 6 to 7 lines.

Hab. New Zealand (Port Nicholson).

## ELATER LATERISTRIGATUS.

Deep black; the side of elytra with a long red vitta,

highly polished and minutely punctulate; elytra with obscure punctured striæ and a few short hairs, the apex of elytra bluish.

Length,  $8\frac{3}{4}$  lines.

Hab. New Zealand (Port Nicholson), Capt. Parry.

## ELATER (DRASTERIUS) NIGELLUS.

Thorax and elytra closely punctured; thorax with a depression on each side in middle behind; elytra distinctly longitudinally striated.

Length,  $2\frac{1}{2}$  to  $2\frac{3}{4}$  lines.

Hab. New Zealand (Port Nicholson), Capt. Parry.

## ELATER OLIVASCENS.

Head, thorax, elytra and abdomen of an olive green, with scattered gray hairs; antennæ and legs yellowish; elytra with longitudinal striæ.

Length, 4 lines.

Hab. New Zealand.

## ELATER STRANGULATUS.

Thorax long, about the middle on the side strangulated; the whole insect of a dull brown, thickly clothed with short yellowish-brown hairs.

Length, 8 lines.

Hab. New Zealand, Capt. Parry.

## ELATER MEGOPS.

Eyes very large; thorax narrower than the elytra, with the sides nearly parallel, finely punctured, and sparingly covered with short hairs; elytra very long, punctato-striated, dullish brown; suture of elytra with purplish gloss.

Length, 7 lines.

Hab. New Zealand (Bay of Islands).

## ELATER (CTENICERUS) PUNCTITHORAX.

Head impressed in the middle and sprinkled with hairs; antennæ with second and third joints very small, joints fourth to tenth on the inside at the end with a longish lobe, the terminal one longest, with a slight tooth near the end; thorax very smooth, with scattered points, two deep, longitudinal impressions before the middle, and two lunated impressions behind, and a short impressed line on the posterior margin; elytra depressed at the end and somewhat blunt, with nine striæ on each, in some places deeper than others, near the suture, at the tip, and near the side margin.

Length, 8 lines.

Hab. New Zealand (Port Nicholson), Capt. Parry.

ELATER (CTENICERUS) LEVITHORAX. *Pl. 1, f. 10.*

Very similar to the last; the thorax has not the deep punctures.

Length,  $8\frac{3}{4}$  lines.

Hab. New Zealand.

## Family CEBRIONIDÆ.

## ATOPIDA, White.

Head with the jaws produced, on the outside gradually rounded; antennæ very long, filiform, first joint somewhat thickened and flattened, the second joint small and rounded; the other joints nearly of one size, very slightly thickened at the end; eyes rather large and prominent; head nearly as wide as thorax; thorax in front somewhat wider than behind, but not so wide as the elytra, wider than long, anterior angles sharpish, posterior rounded; scutellum short, pointed at the end; elytra much elongated, sides parallel, shoulders and tips of elytra rounded; legs moderate; edge of tibiæ sharp.

This genus approaches closely to *Atopa*.

## ATOPIDA CASTANEA.

Deep chestnut brown; finely punctured with short hairs proceeding from the punctures; antennæ and legs testaceous.

Length, 4 lines.

Hab. New Zealand (on Kaudi).

## Family CLERIDÆ.

## OPILUS VIOLACEUS.

*Opilus violaceus*, *Klug, Abh. Berl.* 1840, 391.

*Notoxus violaceus*, *Fabr. Ent. Syst.* I. 210, 2.

Pubescent, blackish, violaceous, shining; elytra smooth, with three yellow spots, one at the base, two approximating near the middle; legs ferruginous; femora black, ferruginous at the base.

Hab. New Zealand.

## OPILUS PANTOMELAS.

*Notoxus pantomelas* *Boisd. Voy. Astr. t. 6, f. 14.*

Deep black, with a greenish hue on some parts; in some specimens there is a small yellowish spot about the middle of each elytron.

Hab. New Zealand (Port Nicholson), Mr. Earl.

## Family PTINIDÆ.

## ANORIUM TRICOSTELLUM.

Antennæ very long, with the last eight joints filiform; brownish, testaceous, covered above with a waved, short golden silky pubescence; each of the elytra with three slightly raised, longitudinal costæ; thorax narrowest on the sides, somewhat rounded behind and slightly hollowed down the middle.

Length, 4 lines.

Hab. New Zealand, Mus. Saunders.

## PTINUS SUTURALIS.

Pitchy brown; closely punctured with shortish hairs; the suture with a pinkish hue; legs pale yellow.

Length, 2½ lines.

Hab. New Zealand (on flowers of *Leptospermum*).

## PTINUS MURINUS.

*Ptinus murinus*, *Parry, MSS.*

Very deep brown, with many irregular longish patches of yellowish hairs.

Length, 2½ lines.

Hab. New Zealand (Port Nicholson), Capt. Parry.

## PTINUS PILOSUS.

Elytra nearly parallel; light ash colour, with short, yellowish hairs; thorax behind as wide as elytra.

Length, 1½ line.

Hab. New Zealand (Port Nicholson).

## Family NITIDULIDÆ.

## NITIDULA ANTARCTICA.

Very dark brown, with the elytra on each side of the scutellum with a somewhat lighter spot; legs with the femora yellowish.

Length, 1½ line.

Hab. New Zealand (Port Nicholson), Capt. Parry.

## NITIDULA LATERALIS.

Of a pitchy brown, closely punctured; sides of thorax widely, and sides of elytra narrowly, margined with yellowish; base of elytra near the scutellum yellowish.

Hab. New Zealand (Kandi Wood).

## NITIDULA ABBREVIATA.

*Nitidula abbreviata*, *Fabr. Syst. El.* I. 348, 5.

Hab. New Zealand.

## Family HISTERIDÆ.

## SAPRINUS PSEUDO-CYANEUS.

Head black; thorax purplish; elytra and abdomen deep green; thorax near the margin closely punctured, the points thickest in front, behind free from points, posterior edge with a few punctures; elytra near the shoulder with two or three oblique, impressed striae and several distinct punctures at the base, behind with a lunar mark of minute punctures suture, except at the base, with an impressed line on each side.

Length, 2½ lines.

Hab. New Zealand.

## HISTER CINNAMOMEUS.

Smooth, deep, rich, purplish brown; head in front considerably hollowed out; elytra near the sides with three slightly curved, deeply impressed lines, and three shallow impressed lines at the end of each elytron between these and the suture.

Length, 1½ line.

Hab. New Zealand, Capt. Parry.



## Family LUCANIDÆ.

## DENDROBLAX, White.

Head narrow, narrowest behind, in front widened and truncated; mandibles, viewed from above, somewhat ovate and bent at the end, hollowed, on the outside somewhat angled at the end; eyes very large, well seen from above; antennæ longish, ten-jointed, basal joint nearly as long as the other joints taken together, the joints from the second to the sixth short and roundish, somewhat angular about the middle, the three last joints forming a roundish head, the last rather the largest; thorax not so wide as elytra, with the sides in front rounded, in the middle considerably notched for the reception of the head, side angled in the middle, behind rather straight, middle slightly convex; elytra very wide, edge slightly margined; legs with the anterior tibiae wide and strongly toothed on the outside, tibiae of middle pair toothed on the outside, of hind pair much thickened at the end and hollowed out where the tarsi are inserted, two long lobes on the inside; tarsi slender.

This genus comes near *Lamprima* and *Ryssonotus*.

DENDROBLAX EARLII. *Pl. 2, f. 9, 10.**Dendrobis Earlianus.*

Deep blackish brown; head, thorax and elytra deeply punctured; head above, thorax above, in front and behind with ferruginous, silky hairs; scutellum with ferruginous hairs; elytra with four longitudinal flattish ridges, the outer obsolete; under side of thorax and legs with many ferruginous, silky hairs.

Length,  $9\frac{1}{2}$  to  $12\frac{1}{4}$  lines.

Hab. New Zealand, on the Hutt River, Port Nicholson, Mr. Earl.

MITOPHYLLUS IRRORATUS, *Pl. 2, f. 3, 4.*

*Mitophyllus irroratus*, *Parry, Trans. Ent. Soc. Lond.* IV. 56, t. 1, f. 4.

Pitchy red, with dull black spots scattered over the whole body; mandibles correct, recurved, in front sharp and behind denticulate; antennæ with the three last leaflets very much elongated and pilose; thorax quadrate, not margined; elytra nearly thrice the length of the thorax, of a pitchy brown, reddish, punctate, with dull black spots sprinkled over the disk; femora thickened; tibiae onespined, serrated on the outside; prosternum and mesosternum simple, not produced. ♂

In the female the three last leaflets of antennæ are of moderate size; mandibles small, not much correct, one-toothed at the base; body and thorax more rounded than in the male.

Length,  $4\frac{1}{2}$  lines, breadth,  $1\frac{1}{2}$  line.

Hab. New Zealand (Port Nicholson).

## DORCUS PUNCTULATUS.

Covered over above with minute punctures; elytra with four indistinct, longitudinal lines, with fewer punctures on them; scutellum punctured; anterior femora with six teeth on the outside.

Length, 6 to 7 lines.

Hab. New Zealand (Wellington.)

DORCUS SCUMADORSIS. *Pl. 2, f. 2.*

Black; a lunated spot midway between the eyes and another on the side of and behind the eyes, with deep punctures and some yellowish scales on them; thorax with lateral and posterior margins and the side of anterior margin with impressed punctures and yellowish scales in them, and four spots on the back, the posterior running into the hind margin; the elytra with a widish band round each, formed by deep punctures and scales in them, and four large spots similarly impressed filling up most of the surface of elytra; scutellum with a smooth edge behind; anterior tibiae with four widish teeth on the edge, the edge itself impressed.

Length, 7 to  $7\frac{1}{2}$  lines.

Hab. New Zealand (Port Nicholson).

## LUCANUS RETICULATUS.

*Lucanus reticulatus*, *Buquet MSS. Westwood, Proc. Ent. Soc. April 1, 1844, Ann. and Mag. Nat. Hist. XVII. p. 59.*

Mandibles short, thick, bluntly toothed within, somewhat depressed; black, thorax subquadrate; thorax and elytra reticulated with scales.

Length, 6 lines.

Hab. New Zealand, Mus. Buquet.

## Family APHODIIDÆ.

## OXYOMUS EXSCULPTUS.

*Oxyomus exsculptus*, *Parry, MSS.*

Very deep brownish black; the lateral margin of a rich, deep reddish brown; head widely notched in front, above smooth; thorax punctured, especially behind, in front and spot on sides smooth; elytra with the striae very deeply punctured; anterior tibiae with three sharp teeth.

## Family DYNASTIDÆ.

## CHEIROPLATYS Kirby, Hope.

CHEIROPLATYS TRUNCATUS. *Pl. 2, f. 6.*

*Cheiroplatys truncatus*, *Hope, Col. Man. I. 85.*  
*Scarabeus truncatus*, *Fabr. Ent. Syst. I. 7, 16. Olic. t. 11, f. 103.*

Elytra near the suture hollowed out, smooth, with a few slightly impressed lines running in different directions; scutellum with a row of rather coarse punctures parallel to the edge; under side of thorax with deep ferruginous hairs.

Hab. New Zealand.

CHEIROPLATYS PUNCTATUS. *Pl. 2, f. 11.*

Head with a flattish, somewhat triangular projection on the crown, behind which are two rather coarsely punctured depressions; thorax with a protuberance in the middle of the fore edge, depressed behind; the sides of thorax with two depressions on each side, the posterior largest; scutellum smooth; elytra covered with punctures, some of them arranged in lines; the whole of the upper side very deep blackish brown, the suture pitchy; front of the head, under side of body and legs pitchy brown; under side of

thorax covered with long, pale ferruginous, silky hairs; meso-tibiae and meta-tibiae behind with a row of longish ferruginous hairs.

Length,  $9\frac{1}{2}$  lines.

Hab. New Zealand (Waikouaiti), Mr. Earl.

Family MELOLONTIIDÆ.

RHISOTROGUS ZEALANDICUS.

Head dark brown punctured, smooth behind; clypeus yellowish punctured; thorax dark brown in the middle, the sides yellowish, a smooth impression on each side; elytra bulging much on the side, with four longitudinal lines, the suture smooth; head, thorax and margins of elytra with scattered brownish hairs; legs yellowish; fore-tibiae on the outside with three largish brown teeth; under-side of abdomen yellowish.

In one variety the back of thorax is free from hairs; in another the margin of elytra is brownish.

Length, 5 to  $5\frac{1}{2}$  lines.

Hab. New Zealand (Port Nicholson).

ODONTRIA, White.

Head large; clypeus rounded on the sides, in front somewhat straight, the edge slightly turned up; antennæ eight-jointed, first joint as long as next two taken together, considerably bent and clubbed at the end, with some stiffish bristles directed outwardly and a fringe of delicate hairs on the opposite side, second joint short, inserted on upper part of first before the end, thickened and truncated at the tip, third longish, sides almost parallel, a strong tooth directed backwards at the base on the outside, head formed of five leaf-like plates, first the shortest, next three equal in length and thickness, third thickest, somewhat convex on outside; elytra almost covering the abdomen, sides close to the base slightly bulging; legs with the fore-tibiae with three teeth on the outside, at the end very oblique; tibiae of hind-legs with two long spines on outside at the end, in the middle hollowed out and on the outside crested round with sharpish spines; tarsi elongated, each joint with several spines at the end.

A genus of Melolonthidæ not far from Rhisotrogus. Described from a male.

ODONTRIA STRIATA. Pl. 2, f. 5.

Head brown, deeply punctured, behind smooth and yellow; clypeus yellow, with a brown spot behind; thorax deep brown, the sides and some other spots yellowish, covered with longish yellow hairs, with some black intermixed; elytra yellowish brown, with nine rows of blackish punctured lines and a few blackish spots placed irregularly between some of these rows, a few longish scattered hairs on the upper surface; under parts of thorax covered with soft yellowish hairs; under-side of abdomen yellow, varied with black; legs yellow, with some blackish hairs and spines on tibiae; tarsi blackish.

Length,  $7\frac{1}{2}$  lines.

Hab. New Zealand (Otago), sides of hills on flowers.

ODONTRIA XANTHOSTICTA.

Head deep brown, coarsely punctured; clypeus brownish yellow; thorax and elytra covered with close-pressed, yellowish brown, silky hairs, the surface beneath which is deep brown, with numerous small yellow spots; under-side light brown; legs paler.

Length, 6 lines.

Hab. New Zealand.

ODONTRIA CINNAMOMEA.

Head deep brown; clypeus yellowish, both sparingly punctured; the head behind with a smooth transverse line; thorax and elytra of an almost uniform cinnamon brown, covered with yellowish brown silky hairs; under-side of legs of a pale yellow; fore-tibiae with three bluntish teeth at the end.

Length, 6 lines.

Hab. New Zealand, on bushes.

EUSOMA, White.

Head rather large; clypeus rounded, with the edge slightly turned up; last joint of palpi the largest, oblong-ovate; antennæ eight-jointed, first two joints thick and rounded, third longish, very slightly thicker at the end, fourth oblong, four last joints leaf-like, the fifth the shortest, the last three nearly equal in length and thickness; thorax transverse, about the same width as elytra, the sides somewhat rounded; elytra covering the abdomen, sides nearly parallel; scutellum longish; legs long; tarsi very long; claws simple; front tibiae on the outside with three teeth.

A beautiful little Lamellicorn insect near Dichelonycha, Kirby.

EUSOMA ROSSII. Pl. 2, f. 1.

Clypeus yellow; head in front and spot on vertex yellow, space before and to the side of the eyes deep brown; thorax yellow, with three longitudinal lines in the middle not touching the front margin, the middle straight and narrow, the side-lines wider and somewhat waved; elytra yellow, with whitish, deep brown reticulations; head and thorax with irregular punctures; elytra with at least nine rows of longitudinal striæ; legs and under-side pale yellow.

Length,  $3\frac{1}{2}$  lines.

Hab. New Zealand (Kauai).

PYRONOTA, Boisd. CALONOTA, Hope.

PYRONOTA FESTIVA.

Pyronota festiva, Boisd. Faune de l'Oc. II. 214.  
Melolontha festiva, Fabr. Ent. Syst. II. 166, 48. Olie.  
t. 5, f. 48.

Calonota festiva, Hope, Col. Man. I. 40.

Head green; clypeus notched; antennæ ferruginous,

with a black club; thorax smooth, green, shining, with a brown dorsal line; elytra green, smooth, with nine striae, suture brown; body beneath testaceous, covered with white hairs; sternum porrect, somewhat horned.

Var. *Melol. leta*, *Fabr. Ent. Syst.* II. 166, 49, *Oliv. l.* 6, f. 56.

Above of a golden colour; line on thorax and scutellum of a red colour.

Hab. New Zealand.

STETHASPIS, Hope. MICRONYX, Boisd.

STETHASPIS SUTURALIS. *Pl.* 2, fig. 7.

*Stethaspis suturalis*, *Hope, Col. Man.* I. 104.

*Melolontha suturalis*, *Fabr. Ent. Syst.* II. 161, 25, *Oliv. l.* 7, f. 85.

*Micronyx chlorophyllus*, *Boisd. Voy. Astrol.* II. 189.

*Rutele chlorophylle*, *Boisd. l. c. Atlas*, t. 6, f. 18.

Head green, unspotted, margin raised; thorax smooth, green, the margin slightly yellowish, behind bluntly angled; elytra smooth, somewhat striated, green, suture yellowish; breast and abdomen covered with white hairs; legs green; tarsi ferruginous.

Hab. New Zealand.

FAMILY TENEBRIONIDE.

PRIOSCELIDA, White.

Head small, transverse; antennae with the last six joints transverse and considerably wider than the others; thorax as wide as elytra, somewhat narrower in front; anterior tibiae at base very narrow and somewhat cylindrical, on the inside dilated, on the outer edge serrated; meso-tibiae on the outside with many short spines; meta-tibiae quite smooth; femora of anterior legs thicker than the others.

PRIOSCELIDA TENEBRIONOIDES.

Pitchy brown; thorax very slightly margined, polished and very delicately punctulated; elytra with eight longitudinal striae on each, the striae distinctly punctured; under-side and legs rather lighter in colour than upper part.

Length,  $6\frac{1}{2}$  to 7 lines.

Hab. New Zealand (Waikouaiti), in sand and under stones.

CILIBE GRANULOSUS.

*Cilibe granulosis*, *Breme, Cossyph. p.* 39, t. 7, f. 5.

Clouded brown, elongated, pointed at the end, smooth; head porrect, rounded; thorax not sinuated, somewhat convex, rugose, with the disk narrow, rugose; elytra granulated, with many slight ribs; the disk nearly obsolete.

Hab. New Zealand, Capt. Parry.

CILIBE PHOSPHUGOIDES.

Very deep brownish black; antennae and legs slightly ferruginous; head and thorax very closely punctured; thorax margined; elytra very irregularly punctured, and with many very obscure longitudinal striae.

Hab. New Zealand.

A species resembling the preceding in many respects, but considerably wider.

OPATRUM TUBERCULICOSTATUM. *Pl.* 1, f. 13.

Covered with a light brown, sponge-like matter; thorax with the side-margin in front slightly sinuated; elytra at the base depressed, gradually elevated to beyond the middle, then somewhat suddenly inclined to the tip, each with four longitudinal costae in addition to one close to the suture, on which are some warts wider than the ribs, beyond the middle of each is a tubercle higher than the rest, one next the suture with this tubercle farther back than on the others; antennae with the third joint longest.

Length, 6 lines.

Hab. New Zealand, Mus. Saunders.

OPATRUM LEVIGATUM.

*Opatrum levigatum*, *Fabr. Ent. Syst.* I. 89, 5.

Hab. New Zealand, Banks' Cabinet.

FAMILY HELOPIDAE.

ADELUM HARPALOIDES. *Pl.* 1, f. 14.

Greenish olive brown, shining; antennae and legs ferruginous; head and thorax very finely punctured; the head with two longitudinal distant grooves, connected in front by a shallow transverse line; thorax scarcely as wide as the elytra, very finely margined; middle and hind femora with ferruginous hairs behind.

Hab. New Zealand (Waikouaiti).

PSEUDHELOPS, Guérin.

PSEUDHELOPS TUBERCULATUS.

*Pseudhelops tuberculatus*, *Guérin, Rev. Zool.* 1841, 125.

Obscure bronze colour above, of a blackish colour beneath, in form very closely approaching *Helops caraboides*, but smaller, and a little more contracted behind; head and thorax very finely punctured; two very feeble, transverse impressions on the head; scutellum small, triangular; elytra oval, convex, somewhat pointed behind, very finely punctured, with striae of deep and oblong points rather close to each other; each elytron has behind and near the end four oblong tubercles which seem to be formed by the termination of the costae, effaced on the disk of the elytra.

Hab. Auckland Islands.

RYGMODUS, White.

Of an oval shape, very convex; the head and thorax bent down; elytra longer and wider than the abdomen; legs longish and somewhat flattened; clypeus subquadrate, slightly notched at the end; antennae apparently eight-jointed, the first long and slender, second roundish, third, fourth and fifth small, appearing to form but one joint, sixth, seventh and eighth flattened and widened, forming a longish club.

Near *Amarygmus*.

RYGMODUS MODESTUS.

Head, thorax, scutellum, under-side and legs black; elytra of a deep metallic green, with ten longitudinal, finely

punctured striae, the marginal not reaching the base, those nearest the suture deepest; head in front of eyes with two impressed dots, above very finely punctured; thorax with the side-margin somewhat hollowed above, hind-margin with two distant impressed points.

Hab. New Zealand (Port Nicholson), Capt. Parry.

#### RYMODUS PEDINOIDES.

Bronzy black; elytra with ten longitudinal striae, rather deeply grooved, finely punctured and running up close to the base; clypeus straight in front; thorax somewhat flattened on the sides, with two distant impressed points behind.

In this species the legs are shorter than in *R. modestus*, and the elytra are less attenuated behind.

Hab. New Zealand (under stones).

#### TITENA.

*Titena*, *Erichson*, *Archiv. F. Nat.* 1842, 178.

#### TITENA ERICHSONII.

Head, thorax, legs and under-side of a deep black; the elytra purple; antennae, palpi and tarsi ferruginous; head and thorax rather finely punctured, the latter with four impressed points on the disk; each elytron with eight rows of punctured striae which are greenish, the spaces between are somewhat raised and divided into oblong tubercles by short transverse grooves, which are green, but not punctured like the striae.

Hab. New Zealand, Capt. Parry.

#### TANYCHILUS, Newman, *Ent. Mag.* V.

##### TANYCHILUS METALLICUS.

Above of a deep, metallic, shining green, darkest on the head and thorax; under-side of body and legs deep blackish brown; head with the eyes distant, above finely punctured, a small, smooth space in the middle; thorax very smooth, with two or three impressions behind; elytra with eight longitudinal, closely punctured striae, and one much abbreviated close to the scutellum; the five inner rather deeply grooved, the three outer quite superficial.

Hab. New Zealand (Wellington), Capt. Parry.

#### FAMILY DIAPERIDÆ.

##### CHÆRODES, White.

Head small, wider than long; antennae twelve-jointed, first joint thickest, oblong, second joint very small, almost concealed, third joint rounded, fourth to ninth joints close together, somewhat cup-shaped, gradually larger; three terminal joints wide, cup-shaped, nearly equal in size; thorax transverse, very convex across, sides rounded, somewhat angulated at the side behind; scutellum very small; elytra ovato-quadrate, sharp-pointed at the end, much arched; legs strong; anterior tibiae somewhat flattened, deeply sinuated on the outside and ending in a longish blunt lobe; front tarsi with five hairy joints, the terminal widest; tarsi of middle legs with five somewhat elongated joints, the basal the largest; hind legs with four somewhat cylindrical joints, the basal largest and thickest; tibiae of middle and hind legs with two blunt spines at the end.

Near *Phaleria*.

#### CHÆRODES TRACHYSCÉLIDES. *Pl.* 2, fig. 12.

Pale yellowish, thickly punctured; two large obscure spots on thorax; the greater part of disk of elytra with small obscure spots, in some specimens confluent; tibiae of middle and hind legs at the end thickly covered with short, somewhat rufous bristles.

Length,  $3\frac{1}{2}$  lines.

Hab. New Zealand (Wellington), Mus. Saunders.

#### BOLITOPHAGUS ANTARCTICUS. *Pl.* 1, f. 12.

Thorax on the sides with three strong projecting teeth, the fore and hind angles also sharp, six pointed tubercles on the disk in two longitudinal rows, the disk itself covered with closely placed warts; elytra with three rows of distant pointed tubercles on each, the side-margin at the end with two or three teeth; each elytron with eight rows of punctured striae. The whole insect is of a rich brown colour.

Length,  $3\frac{1}{2}$  lines.

Hab. New Zealand (Port Nicholson), Mus. Saunders, Parry.

#### PRISTODERUS SCABER.

*Pristoderus scaber*, *Hope*, *Col. Man.* III, 181, & p. 81.  
*Dermestes scaber*, *Fabr. Syst. Ent.* 57, 16.

Hab. N. Zealand.

#### FAMILY MORDELLIDÆ.

##### MORDELLA ANTARCTICA.

Deep black; a small spot on the edge close to the base, and a waved transverse band beyond the middle of each, white, the shoulder with a raised ridge; under-side of abdomen with a few whitish spots; head slightly hollowed in the middle in front.

Hab. New Zealand (Port Nicholson), Capt. Parry.

#### FAMILY MELANDRYIDÆ.

##### DRYOPS LINEATA.

*Dryops lineata*, *Fabr. Ent. Syst.* II, 75, 4.

*Lagria lineata*, *Fabr. Syst. Ent.* 124, 3.

Pale ochrey; head with an obscure roundish spot on the vertex; thorax with three brown lines; elytra smooth, pale ochrey, with a wide brown vitta not reaching the tip; beneath pale ochrey.

Hab. New Zealand.

This species varies much in size; in some specimens there is only one bend down the middle of thorax, in others there is a brownish dot on each side behind.

##### DRYOPS STRIGIPENNIS.

Very pale yellowish; tips of the mandibles black, between the eyes brownish; thorax with a blackish streak down the middle; elytra with two longitudinal ribs down each, not reaching the tip.

Hab. New Zealand, Mr. Colenso.



## Family CLEMERIDÆ.

## SELENOPALPUS, White.

Palpi of male with the last joint very large, subfalcate and innate at end; head depressed and somewhat elongated; mandibles sharp, curved, without teeth on the edge; antennæ eleven-jointed; second joint shortest, the other joints cylindrical, the terminal somewhat thickened about the middle and pointed at the end; thorax somewhat longer than broad, rather depressed above, bulging out before the middle; elytra elongated; hind legs with the femora bent and thickened and grooved beneath; tibiæ flattened posterior edge undulated; in the female the last joint of palpi is not much wider than the preceding, and the hind-legs are simple like the preceding.

## SELENOPALPUS CHALYBEUS.

Deep steel blue; the antennæ, palpi and jaws black; thorax in front and behind slightly turned up; on the back with two or three depressions; elytra finely punctured with two longitudinal ribs near the suture.

Hab. New Zealand (♂ ♀).

## SELENOPALPUS SUBVIRIDIS.

Bluish-green; the elytra with short depressed hairs; thorax above even.

Hab. New Zealand (♀) Waimate.

The *Dryops cyanea*, *Fabr. Ent. Syst.* II. 75. 5, seems closely allied to this.

## Family BRUCHIDÆ.

ANTHRIBUS INCERTUS. *Pl. 3, fig. 6.*

Thorax slightly rounded and ridged behind, in front pointed in the middle; above minutely and thickly punctured and slightly grooved down the middle, sprinkled with greyish hairs; elytra with nine longitudinal striæ deeply punctured, nearly obsolete at the end; both the elytra and thorax in unrubbed specimens are most likely covered with grayish scaly hairs; under-side of body closely covered with ash-coloured hairs; antennæ with three terminal joints flattened and much dilated, the first eight somewhat moniliform.

Length,  $2\frac{3}{4}$  lines.

Hab. N. Zealand (Port Nicholson).

## Family BRENTIDÆ.

## BRENTUS CYLINDRICORNIS.

*Brentus cylindricornis*, *Fabr. Ent. Syst.* II. 494. 9.

Beak dull ferruginous; antennæ twice the length of the thorax, dull ferruginous, with cylindrical joints; thorax rounded, bronzy black, very much polished, not channelled; elytra blunt, striated, ferruginous, with numerous short yellow lines, which at the base and tip nearly form a band; femora toothed.

Hab. New Zealand.

## BRENTUS BARBICORNIS.

*Brentus barbicornis*, *Fabr. Ent. Syst.* II. 491. 1. ♂

*Brentus assimilis*, *Fabr. Ent. Syst.* II. 491. 2. ♀

*Male.* Beak very long, with a line of close-set hairs beneath; elytra elongated, clubbed at the end.

*Female.* Beak short, smooth below.

Hab. in the wood of Kaudi Pine. Dr. Hooker, Dr. Sinclair.

RHINARIA SEX-TUBERCLATA. *Pl. 3, fig. 8.*

Black, covered with gray hairs lying in different directions; two black streaks on thorax parallel with the sides; elytra varied with black spots, continuous on the margin and sutures; each of the elytra with three large, somewhat compressed tubercles, one near the base close to the suture, one near the middle and rather closer to the suture than the side-margin, the last near the tip and closer to the margin than the suture; elytra with a slight tail and notch between the suture and tail; beak from the eye to the end as long as thorax, slightly thickened at the end; antennæ as long as the head and thorax, situated midway near the lower part; third joint the longest and most slender; fifth joint slightly thickened at the end; the next five joints more so and flattened; the terminal joint conical at the end; thorax narrow in front; legs with gray scales and hairs; two rings of whitish hairs on the tibiæ.

Length,  $6\frac{1}{2}$  lines.

Hab. Port Nicholson, Mr. Earl.

This species is nearly allied to another New Zealand species in the Banksian cabinet, the *Curculio tridens*, *Fabr. Syst. El.* II. 537, 186. *Oliv. Col. t.* 13, f. 154 (*Rhinaria tridens*).

## Family CURCULIONIDÆ.

## BRACHYOLUS, White.

Antennæ longish, rather stout, funiculus seven-jointed; basal joint of antennæ as long as the head, but not the length of the other joints taken together; club ovate, pointed, indistinctly jointed; beak short, considerably thickened; eyes oblong, not very prominent; thorax nearly square, rather wider in front than behind; scutellum not visible; elytra taken together cordate; at the base of each in the middle a tubercle directed backwards; at the tip bluntnish; legs short and stout.

This genus comes near *Cyclomus* and *Otiorhynchus*: it is densely covered with scales.

BRACHYOLUS PUNCTATUS. *Pl. 3, fig. 5.*

Pale ochrey yellow; thorax above rather deeply pitted, behind brownish yellow; elytra with a transverse yellowish brown band, with many longitudinal lines of rather deep points; on each elytron near the end are two protuberances, the innermost largest.

Length,  $2\frac{1}{2}$  to 3 lines.

Hab. New Zealand (Port Nicholson), Capt. Parry.

## PLATYOMIDA, White.

Antennæ long, slender, basal joint nearly reaching the front of thorax; funiculus seven-jointed, first two joints longest, all the joints thickened at the end and furnished with longish hairs; club elongated, three-jointed, last joint pointed; thorax not much wider than the head, nearly as wide as long; scutellum small, rounded at the end; elytra widest just beyond the middle, each elytron pointed at the end; legs longish, femora somewhat clubbed near the end; tibiae of fore and middle legs slightly bent at the end; tarsi with the second joint small.

This new genus approaches some of the species of *Platynotus*.

## PLATYOMIDA BINODIS.

Grayish, with pink and purplish reflections; thorax grooved in the middle, somewhat warty above; elytra with many longitudinal rows of deepish points, each with a large, somewhat compressed tubercle near the suture, beyond the middle.

Length,  $5\frac{1}{2}$  lines.

Hab. New Zealand, Capt. Parry.

## OTIORHYNCHUS GRISEUS.

Grayish; beak in the middle above with a short, smooth keel; thorax somewhat rounded, rather deeply punctured, deep brown, with grayish scales; elytra covered with small, gray scales, the shoulder somewhat bluntly keeled, the back with longitudinal rows of punctures placed somewhat in pairs, and with small hairs proceeding from the interstices; tibiae with longish, white hairs.

Length,  $3\frac{1}{2}$  lines.

Hab. New Zealand,—Colenso Esq.

## RHADINOSOMUS ACUMINATUS.

*Rhadinosomus acuminatus*, Schönh. *Curc.* VI. 473.  
*Curculio acuminatus*, Fabr. *Syst. Ent.* 152, 132. *Oliv. Pl.* 11, f. 139.

*Leptosomus acuminatus*, Schönh. *Curc.* II. 169. *Waterh. Trans. Ent. Soc.* 11. 192. *Pl.* 17, f. 2.

Hab. New Zealand.

## HOPLOCNEME, White.

Antennæ moderate, scape reaching to beyond the eye, somewhat bent, very little thickened at the end; funiculus six-jointed, first joint thickest, the next five somewhat cup-shaped, the club nearly as long as the funiculus, four-jointed, two first joints cup-shaped, last joint bluntish; beak shortish, thick, depressed, antennal groove short, transversely-oblique, beginning near the end of beak; eyes largish and prominent; thorax somewhat strangled in front, sides rather straight; scutellum distinct, sides parallel, end rounded; elytra straightish at the base, elongated, sides nearly parallel; intermediate and hind pairs of legs with a strong, compressed tooth near the end of the femora; tibiae slightly curved.

Not far removed from *Orchestes*.

## HOPLOCNEME CINNAMOMEA.

Rich chestnut brown; head gradually wider behind, beak ferruginous, between the eyes some fulvous, chestnut scales; thorax thickly clothed with fulvous chestnut scales, with a few blackish hairs intermixed; scutellum pale yellow; elytra covered with fulvous chestnut scales, the sides ferruginous, the back with many shallow, longitudinal lines, with impressed points; many elongated, palish hairs, running somewhat in lines and mixed with the scales on the upper part of the elytra; legs ferruginous, smooth.

Length,  $2\frac{1}{2}$  lines.

Hab. New Zealand,—Colenso Esq.

## HOPLOCNEME HOOKERI.

Bluish black, with ferruginous legs; head behind the eyes wider than the thorax in front, beak smoothish; head thickly punctured above; scape of antennæ pale ferruginous; thorax thickly punctured above, below on each side with a widish line of white, close-pressed hairs; elytra without scales or hairs, with many longitudinal lines with impressed dots, the interstices with short, transverse lines.

Length, 2 lines.

Hab. New Zealand.

## OROPTERUS, White.

Antennæ longish, scape just reaching to the eye, straightish; funiculus seven-jointed, the last joints nearly equal in thickness and close together, club ovate, joints indistinct; beak long, considerably curved, cylindrical, a groove on the sides for the scape of antennæ; thorax gradually wider behind, the sides nearly straight, in front and behind abrupt; elytra at the base straight, with a conical protuberance in the middle, elytra rounded at the end; legs longish; femora very slightly thickened near the end; tibiae straight.

OROPTERUS CONIGER. *Pl.* 3, fig. 15.

Pale ferruginous; beak and head punctured; thorax finely striated transversely; elytra rather coarsely punctured in lines, with a strong, conical, pointed protuberance nearer the margin than the suture, smooth and free from hairs; legs paler than upper parts.

Length, 2 lines.

Hab. N. Zealand.

## SCOLOPTERUS, White.

Antennæ situated in a slight depression on the side of beak near the tip, moderate, slender, scape reaching beyond the eyes, as long as the rest of the antennæ; funiculus seven-jointed, first joint equal to the following two taken together, very distinct from them and thickened at the end, the others gradually larger as they approach the club, which is very long and very distinctly three-jointed, the first two joints cup-shaped; beak slightly bent, somewhat depressed; eyes flattened; thorax gradually wider behind, the sides perfectly straight, in front and behind

truncated, longer than wide; elytra spined; femora of hind legs with a strong, compressed spine on the under-side near the end; tibiae considerably bent at the base.

*SCOLOPTERUS TETRACANTHUS.*

Head and thorax deep black; elytra greenish bronze, the spines purplish black, the femora purplish black, the remainder of the legs purplish ferruginous; head and thorax quite smooth; elytra very deeply punctured in lines, the shoulders produced into a thick angular spine directed outwards and very slightly upwards; each elytron about the middle with a strong spine near the suture directed somewhat backwards and tufted with hair at the end; the intermediate femora with a compressed spine below near the end.

Length,  $3\frac{3}{4}$  lines.

Hab. New Zealand (Port Nicholson).

*SCOLOPTERUS PENICILLATUS. Pl. 3, fig. 10.*

Head and thorax black, the latter with a fine purplish hue; elytra of a glossy olive brown; legs all black; head and thorax very smooth; elytra punctured in lines, but not deeply, the shoulder with a bluntness, not very prominent angle; about the middle of the elytra a high, regular conical protuberance, blunt at the top and with a pointed tuft of black hairs; middle femora with a distinct tooth near the end.

Length,  $2\frac{1}{2}$  lines.

Hab. New Zealand (Port Nicholson).

*SCOLOPTERUS BIDENS. Pl. 3, fig. 12.*

*Curculio bidens, Fabr. Syst. Ent. 136, 51. Oliv. Col. t. 10, f. 113.*

Hab. New Zealand.

*ANCISTROPTERUS, White.*

Head and thorax much narrower than the elytra at the base; eyes very large; beak long, very slightly curved, somewhat thickened at the end; mandibles prominent, thick and somewhat bent at the end; antennae very long, springing from a depression on the upper side of the back near the end, the scape reaching a little beyond the eyes, nearly as long as the rest of antennae, second joint as long as third and fourth together, and at the end double their thickness, club long, somewhat pointed at the end, formed apparently of three joints, the two last closely united; elytra together triangular, the shoulders hooked, the hook standing out, each elytron about the middle with a strong, somewhat erect spine, bristly at the end; legs long, femora slightly clavate, with a small tooth below near the end.

*ANCISTROPTERUS QUADRISPINOSUS. Pl. 3, fig. 14.*

Head and thorax black, rather coarsely punctured; antennae obscure, scape ferruginous; thorax down the middle with a band of yellowish hairs; elytra brownish red, with longitudinal lines formed of deepish dots, the spines

black, a narrow, straight line of white hairs runs from behind the middle spines to the tip of each elytron; under-side of body black; legs light ferruginous.

Length,  $2\frac{3}{4}$  lines.

Hab. Port Nicholson, New Zealand, Capt. Parry.

*PSEPHOLAX.*

*Psepholax, White, Dieffenbach's New Zeal. II. 275.*

Beak short, perpendicularly bent down, wide, somewhat dilated at the end; antennae spring from the end of a deep groove, twelve-jointed, first joint as long as the next seven joints taken together, the tip nearly, if not quite, reaching the eye, very smooth and gradually thickened to the end, the second joint minute, the five preceding the club somewhat moniliform, club large, oval, pointed at the end (of four joints?), covered with minute hairs; eyes roundish, of an ovate elliptical form; thorax behind nearly as wide as the elytra at the base; elytra widest a little behind the base; legs rather stout, femora thickened, those of the first pair with the margin sinuated, bulging into a broad, blunt tooth; tibiae of second pair with a strong tooth near the end.

*PSEPHOLAX SULCATUS. Pl. 3, fig. 1.*

*Psepholax sulcatus, White, l. c.*

Deep pitchy, brownish black; thorax above with three distinct, brownish ashy lines, the lateral ones broadest and somewhat irregular, these lines are formed by distinct, coloured scales; elytra ribbed, each with at least six raised ribs, two of which meet at the end, some of them have erect scales along the irregular edge, between each is a line of impressed points, the sides of the elytra at the broadest part are very hairy; legs punctate and like the under surface of the body, with brownish ashy hairs, longest on the posterior part of the tibiae and tarsi.

Length, about 4 lines.

Hab. New Zealand, Dr. Sinclair.

*PSEPHOLAX BARBIFRONS.*

Beak with two longitudinal rows of ferruginous hairs on the margin directed forwards; thorax thickly punctured; elytra narrower than in *P. sulcatus*, with eight longitudinal striae, the intervening spaces flat at the base, two of these at the tip raised and crested with light brown scales; whole insect deep brown, mixed with lighter coloured scales.

Length, 4 lines.

Hab. New Zealand, Mr. Earle.

*PSEPHOLAX CORONATUS. Pl. 3, fig. 4.*

Black; thorax punctured, with three interrupted lines of grayish scales; elytra very slightly grooved, the base with many slight, transverse rugosities, on the posterior half a circle of erect spines, behind which are two or three rows of shorter spines, near the base a transverse band of grayish scales, under side of body covered with short, grayish hairs.

Length, 4 lines.

Hab. New Zealand (Waikouaiti), in the centre of a tree, Mr. Earle.

## OREDA, White.

Antennæ with the first joint scarcely reaching to the eye, somewhat bent and with a longish club at the end, second joint small, rounded (others broken off); head not so long as the thorax, beak depressed, with two very distinct, broad mandibles at the end; antennæ spring from the end of a groove, which begins before the middle of the beak and extends to the eye; eyes round, moderate, flattened, situated at the base of beak in an angle, and slightly directed forwards; under part of head large, bulging and rounded; thorax in front above narrowed and tubular, sides much rounded, behind truncated and somewhat bisinuated; elytra in front of about the same width as the thorax behind, near the apex somewhat depressed, the tip rounded, the edge of elytra widely sinuated; pygidium not exposed; legs shortish, stout, femora notched at the end, a wide groove between the fore legs.

This genus seems to come near *Piazorus*, *Schönh.*

OREDA NOTATA. *Pl. 3, fig. 2.*

Deep, rich blackish brown, the beak very finely punctured, a slight groove in a small smooth space on the upper side of beak between the antennæ; thorax thickly punctured, with black scales in many of the punctures, and two small spots of yellow scales, one on each side in front, each of the posterior angles with a transverse line of yellow scales; elytra with distinct, longitudinal grooves, which are punctured and shining black, with small scattered patches of yellowish scales.

Length, 5 lines.

Hab. New Zealand (Port Nicholson), Capt. Parry.

The only specimen of this insect which I have seen is much mutilated, the fore legs and the greater part of antennæ being broken off. It has much the appearance, at first sight, of *Pissodes* Pini.

## ALDONUS, White.

Antennæ moderate, first joint not reaching to the eye, very slightly bent and gradually thickened to the end; funiculus seven-jointed, first and second joints longish, the second longer than the first and considerably thickened at the end, the last five joints somewhat cup-shaped, gradually wider to the end, the club being hardly distinct from the funiculus, ovate, slightly pointed and indistinctly three-jointed; beak rather long, not thickened at the end, the sides nearly parallel, side antennal groove beginning before the middle and continued to the eye, widening behind; thorax somewhat contracted in front, rounded on the sides, with a considerable lobe on each side of hind margin, which has two wide sinuations on the middle part, above somewhat depressed; scutellum very small and considerably sunk; elytra with the sides for a good space parallel, the end rounded and completely covering the abdomen; legs moderate in length and thickness, femora somewhat compressed, deeply notched on the underside near the end; a wide groove on the under side of thorax extending to the base of second pair of legs.

ALDONUS HYLOBIODES. *Pl. 3, fig. 9.*

Black, thickly covered with grayish yellow scales; thorax thickly punctured; elytra with several longitudinal lines, deeply punctured, thickly covered with grayish yellow scales, sprinkled with black, some small, irregular black marks on elytra, especially about the middle and near the end; under side of body black, rather deeply punctate, with a few scattered, yellowish gray hairs; legs black, rather thickly covered with yellowish gray hairs.

Length,  $5\frac{1}{2}$  lines.

Hab. New Zealand (Port Nicholson), Capt. Parry.

In Capt. Parry's collection there is another specimen not half the size of the above, and differing from it somewhat in marking, but in other respects so similar that I can only regard it as a small variety. There is a waved, black line on the side of each elytron.

EUTHYRHINUS SQUAMIGER. *Pl. 3, fig. 3.*

Beak straight; thorax very narrow in front, somewhat flattened above; elytra at the base near the scutellum, with a rounded, prominent lobe, between which and the sharpish-pointed shoulder is a considerable sinuation, above slightly striated longitudinally, behind very sharp-pointed; head, thorax and elytra with round scales of black and white mixed, front of thorax just behind the crown of head with two tufts of whitish hairs; femora rather thicker in the middle, with a considerable notch at the end; legs covered with whitish scales.

Length, 5 lines.

Hab. New Zealand (Observatory).

This species in size and general appearance is closely allied to *Euthyrhinus mediatubundus*, *Cheer. Schönh.* (*Curculio mediatubundus*, *Fabricius Ent. Syst. II.* 432).

## RHYNCHODES, White.

Beak slightly thickened at the end and somewhat bent throughout, the antennal groove extending to the eye; thorax in front narrowed, sides bulging, somewhat flattened above; scutellum a roundish raised knob; elytra elongated, covering the abdomen; sides compressed and parallel, suddenly sloping to the end, which is sharp-pointed the back is very convex, transversely and longitudinally, deeply grooved, at the base, near the scutellum rounded, near the margin sinuated; legs with the femora nearly of equal thickness, slightly sinuated beneath near the end.

This genus approaches closely to *Euthyrhinus* of Chevrolat.

RHYNCHODES URSUS. *Pl. 3, f. 16.*

Deep brown; the thorax with two longitudinal bands of a lighter colour near the side; elytra above with five rows of hairs, on each side of which is a row of very deep punctures, between every two of which is a smoothish ridge; across the elytra are two obscure, dark brown bands; legs black, femora above at the end with a spot of yellowish brown hairs; abdomen beneath with the last segment having two tufts of hair.

Length,  $10\frac{1}{2}$  lines.

Hab. New Zealand (Port Nicholson), Mr. Earl.



RHYNCHODES SAUNDERSII. *Pl. 3, f. 13.*

Covered with a light, gray down, the hairs of which run in different directions; thorax closely punctured, a short ridge in the middle behind; elytra on upper part with three double rows of punctures, between every two of which is a slight ridge; antennæ more slender and less heavy than in *R. ursus*; femora with the inside and the tips above with short, grayish hairs.

Length,  $8\frac{1}{2}$  lines.

Hab. New Zealand, Mus. Saunders.

## STEPHANORHYNCHUS, White.

Antennæ long, slender, inserted on the upper part of the side of the beak near the tip, first joint reaching to beyond the eyes, slightly curved at the base, thickened at the end into a club; funiculus seven-jointed, first joint longest, thickened at the end and very distinct from the others, the second slightly elongated, other five almost globular, club almost as long as funiculus, three-jointed, the first joint cup-shaped, the second the longest, gradually thicker towards the end, the terminal joint ovate and pointed at the end; beak long, thick, slightly bent, squareish; an oblique, deep groove from the base of antennæ, terminating on side of under part considerably before the eye, beak crested in the middle in front of the eye, and on the vertex a considerable prominence with two slight tufts; head behind the eyes strangled; eyes lateral, round, large, prominent, situated behind the middle of head; thorax somewhat angulated on the sides, narrow in front, almost straight behind; scutellum longer than wide; elytra oblong, widest at base, end bluntish, shoulders rectangular; legs long, femora thick, clavate, with a strong, compressed tooth on the under side; tibiæ slender, those of first two pairs of legs slightly curved, the tibiæ of hind legs very much curved.

STEPHANORHYNCHUS CURVIPES. *Pl. 3, f. 11.*

Deep yellowish brown, varied with spots and lines of different shades of colour; legs yellowish, posterior femora above with a black band; elytra with two longish, keeled protuberances, one on each side of the suture about the middle.

This species seems to vary much in colour, some specimens being of a light, others of a darkish gray.

Length,  $3\frac{1}{2}$  to 4 lines.

Hab. New Zealand (Port Nicholson), Mus. Brit., Parry.

This appears to be closely allied to a Brazilian insect described by Fabricius from the Banksian collection, the *Curculio attelaboides*, *Fabr. Syst. El.* II. 543, 227. *Olivier. Col.* 522, t. 14, f. 174.

## CURCULIO MODESTUS.

*Curculio modestus*, *Fabr. Ent. Syst.* II. 453, 250. *Oliv. Col.* t. 14, f. 178.

Hab. New Zealand.

## EURHAMPHUS FASCICULATUS.

*Eurhamphus fasciculatus*, *Shuckard, Ent. Mag.* V. 506, t. 18.

Hab. New Zealand.

## DRYOPHTHORUS, Sch.

DRYOPHTHORUS BITUBERCULATUS. *Pl. 3, f. 7.*

*Dryophthorus bituberculatus*, *Schönh. Curc.* IV. 1090.

*Curculio bituberculatus*, *Fabr. Ent. Syst.* I. 414, 90.

*Calandra bituberculata*, *Oliv. t.* 13, f. 167.

Pitchy brown; antennæ and legs reddish; beak not impressed at the base; thorax deeply punctured, slightly constricted within the tip, slightly rounded on the sides; elytra towards the tip somewhat attenuated, punctato-striated, the spaces between flattish, the points over the body filled with grayish scales.

Hab. New Zealand (in the wood of the Kaudi, *Dammara australis*), varying much in size. From an oversight Fabricius has described the thorax as two-tuberculated, the elytra where they begin to be narrowed project a little, and the name would seem to be derived from this circumstance. In some of the specimens, longish, suberect, whitish scales are mixed with the gray. It is very doubtful whether the insect described by Schönherr and figured here, be the Fabrician species.

## Family TROGOSITIDÆ.

## TROGOSITA, Fabr.

## TROGOSITA AFFINIS.

Pitchy brown, with a depression on the vertex; front of the head in the middle without two little teeth, both head and thorax rather deeply punctured; elytra at the base near the shoulder with a slight depression, the elytra in other respects closely resemble those of the *T. caraboides*, a very widely distributed species.

Length, 4 to  $4\frac{1}{2}$  lines.

Hab. New Zealand.

## GYMNOCHEILA, G. R. Gray.

## GYMNOCHEILA NIGRO-SPARSA.

Deep, bronzy, greenish black; the elytra nearly covered with gray scales, with several black spots; head between the eyes with a deepish depression, and a notch in front of it, above rather deeply punctured, some of the punctures elongated, behind and over the eyes a row of gray scales; thorax with two longitudinal furrows down the middle, which are punctured and slightly squamose, the sides hollowed out above and thickly punctured, the punctures filled with gray scales, middle of thorax quite smooth; each of the elytra with seven longitudinal ridges, the sides of the ridges punctured, the interstices filled with grayish scales, with some patches of black scales, which are more erect than the others, the margin of elytra regularly tessellated with patches of gray and black scales; under side and legs deep pitchy brown.

Length, 6 lines.

Hab. New Zealand, in Kaudi wood, Dr. Hooker.

## GYMNOCHEILA SOBRINA.

Grayish brown, with a few spots and bands of a brownish black; head in front of the eyes with two slight depressions, separated by a notch; thorax smooth in the middle,

considerably punctured, blackish, sides margined with grayish scales; elytra with seven longitudinal keels, regularly punctured down the edge, the punctures reddish brown, the edge between green, the interstices between the rows with brownish gray scales, a few spots and a transverse band or two of a deepish brown colour; legs with the tibiae ferruginous.

Length, 5 lines.

Hab. New Zealand (Wellington), Capt. Parry.

#### Family BOSTRICHIDÆ.

##### APATE MINUTUS.

*Apate minutus*, *Fabr. Syst. Ent.* 54, 4.

Hab. New Zealand, Banks' cabinet.

##### PLATYPUS APICALIS.

Deep brown; the basal joint of antennæ, the metathorax and femora yellow; head sloping, a slight keel on the vertex in the middle; thorax very smooth, shining, the side with a depression for the fore legs, with a notch hardly visible from above; elytra rather deeply channelled, sloping behind, with a strong, tooth-like projection on each near the end, closer to the margin than the suture; anterior tibiae with oblique grooves, which terminate on the outside in teeth.

Length, 2½ lines.

Hab. New Zealand (in Kaudi wood).

##### LYCTUS DEPRESSUSCULUS.

Deep blackish brown; antennæ much shorter than the thorax; thorax with a squareish depression in the middle, a distinct margin on the sides, coarsely punctured above; elytra with longitudinal lines of longish punctures.

Length, nearly 2 lines.

Hab. New Zealand (Port Nicholson).

#### Family CUCUJIDÆ.

##### DENDROPHAGUS BREVICORNIS.

Pitchy brown, varying in shade in different specimens; antennæ when stretched back reaching only to beyond the base of the second pair of legs, first joint not twice the length of the third joint; head somewhat elongated, finely punctured; thorax very slightly depressed, rather widest in front, a longitudinal impression on the disk, with a very slight keel down the middle, anterior angle with two or three denticulations, behind it is narrowest; elytra slightly depressed, with the side margins somewhat hairy, the elytra longitudinally lineated, the lines shallow and punctured; femora thickish and somewhat flattened.

Length, 2¾ to 3 lines.

Hab. New Zealand (Bay of Islands, Port Nicholson).

##### DENDROPHAGUS SUTURALIS.

Testaceous; the elytra paler, a darkish brown line on each suture extending to beyond the middle, where it forms a transverse, widish brown band cut off before the margin; head with two longitudinal, impressed lines, one close to

each eye; thorax with the sides straight and two or three small hairs on the edge, both the head and thorax very finely punctured; elytra with the shoulders rounded, the upper surface with shortish subferruginous hairs and several punctured lines; the legs moderate.

Length, 2½ lines.

Hab. New Zealand (Port Nicholson).

#### Family MYCETOPHAGIDÆ.

##### LATRIDIVS ANTIPODUM.

Deep, shining black; club of antennæ subferruginous; sides of thorax slightly sinuated; elytra somewhat widened about the middle, suture and edge of elytra raised, each elytron with two slightly raised keels, the two inner with an elevation beyond the middle, and two transverse widish depressions before the middle.

Length, 1 line.

Hab. New Zealand, Capt. Parry.

This species is very closely allied to *Latridius nodifer*, described by Mr. Westwood in a note at p. 155 of his *Mod. Class. of Insects*, vol. 1, and figured at p. 152, fig. 13, 23.

#### Family ENGIDÆ.

##### ENGIS POLITUS.

*Engis politus*, *Hope, MSS.*

Deep, smooth black; antennæ and legs ferruginous; head and thorax finely punctured; three terminal joints of antennæ dilated and flattened.

Length,

Hab. New Zealand, Mns. Parry.

##### BITOMA INSULARIS.

Head and thorax deep brown; thorax on each side with two parallel keels and two curved, raised lines in the middle behind; each elytron with four longitudinal ridges and two rows of largish punctures between each, elytra palish brown, with a large, dark brown, triangular mark on the base as wide as the elytra, and a few spots of different sizes.

Length, 1½ line.

Hab. New Zealand (Port Nicholson), Capt. Parry.

#### Family PRIONIDÆ.

##### PRIONOPLUS, White.

*Prionoplus*, *White, Dieffenbach's New Zealand*, II. 276.

Face between the antennæ hollowed out; mandibles shortish, strong, angulated; trophi prominent, somewhat clubbed at the end; eyes large, separated both above and beneath by a rather narrow division; antennæ with the first joint strong, short and thickest at the end, second very small and somewhat cup-shaped, next eight with a spine at the end, third joint the longest, the others gradually shorter, terminal joint bluntish at the end, last joints somewhat flattened; thorax short, transverse, not nearly so wide as the elytra, sides with a strongish spine about the middle, spine angulated at the base; sides of scutell-

lum nearly parallel, abruptly rounded at the end, a smoothish ridge down the middle; elytra longish, rounded at the end and narrowest there, margin slightly turned up; femora with two spines at the end, tibiae with three spines, two shorter on the inside at the end and a longer one on the outside.

*PRIONOPLUS RETICULARIS.*

*Prionoplus reticularis*, *White, l. c. Westwood, Arc. Ent. II. 25, t. 56, f. 1.*

Pitchy brown, margins of abdominal segments beneath paler; elytra margined and of a lighter colour, with three longitudinal veins springing from the base and connected by yellowish nervures, forming irregular reticulations, not corresponding on each elytron, the elytra have a short spine at the end close to the suture; the head, thorax and general surface of the elytra irregularly punctured and vermiculated, thorax covered with many short, wool-like hairs, which give it a brownish hue, a longer tuft on each side behind.

Length, 14½ to 19 lines.

Hab. New Zealand (Port Nicholson, &c.).

Family CERAMBYCIDÆ.

*CERAMBYX (PHLYCTÆNODES?) STRIGIPENNIS.*

*Cerambyx (Phlyctænodes?) strigipennis*, *Westw. Arc. Ent. II. 27, t. 56, f. 6.*

Head broad in front before the eyes, with the face rather oblique and truncated, parts of the mouth small, mandibles short, black at the tip; palpi short, maxillary scarcely larger than the labial; antennæ shorter than the body, first joint clavate, third and several following of nearly equal length, base of the joints black; head with a dark central line, space behind the eyes dark-coloured; thorax constricted near the front margin and dilated on each side into a short, thick, conical spine; disk with four elevated tubercles, the two front placed closer together than the other two; middle of thorax with a dark line; elytra long, nearly parallel with the suture, five longitudinal streaks on each of pitchy brown, first not extending to the base, second and fourth united near the tip, third insulated by them, fourth much abbreviated at the base, fifth slender and submarginal; feet slender and simple; femora very slightly clavate.

Length, 11 lines.

Hab. New Zealand (Port Nicholson), Mus. Parry.

This seems to be nearly related in generic character with *Phlyctænodes* of Newman.

*OPHYRYPUS*, White.

Head scarcely bent down at the end, considerably contracted behind the eyes; antennæ much longer than the body, the joints from the fifth to the eleventh nearly equal in length and longer than any that precede them; eyes lunated, upper and middle parts narrow and nearly equal in width, lower part larger, inside edged with close, short, fine hairs; thorax as long as wide, sides smooth, nearly

parallel; elytra long, narrow, scarcely wider than the thorax, soft, blunt at the end; legs longish, femora gradually thickened to the end.

A new genus, coming near *Trichops* and *Uracanthus*.

*OPHYRYPUS PALLIDUS. Pl. 4, f. 8.*

Pale yellowish; three basal joints of antennæ darker; crown of head with many punctures; thorax with many scattered punctures above, two elongated, bent spaces, one on each upper margin, more densely punctured than the other; elytra with four longitudinal yellow veins, the spaces between thickly punctured with brown, tips of elytra ciliated.

Length, 9½ lines.

Hab. New Zealand (Port Nicholson), Mr. Earl

*EBURIDA*, White.

Antennæ longer than the body, slightly hairy without spines, first joint slightly bent and clubbed, last joints of palpi truncated at the end; eyes lunated, lower lobe largest, slightly sinuated just at the base of mandibles; thorax rather longer than broad, as wide in front as behind, a small spine on the side margin behind, the sides somewhat curved, two round, slightly raised polished tubercles on the back in front, placed transversely; elytra with the sides parallel, the end bluntish and without spine; legs longish, femora gradually clavate, simple at the end.

This genus comes near *Eburia* and *Phoracantha*, not far from *Didymocantha*, Newman, *Ann. Nat. Hist. V. 20.*

*EBURIDA SUBLINEATA.*

Pale testaceous; head and thorax darker; space between the antennæ and eye covered with yellowish hairs; head between and behind the antennæ sparsely punctured, with a few scattered hairs, largish space on crown of head free from hairs; thorax somewhat roughish on the side, punctured rather coarsely except on two tubercles and narrowish line down the middle, which are smooth, several scattered, yellowish hairs, thickest on front of the tubercles and on a line behind them, triangular, covered with yellowish hairs; elytra thickly and rather coarsely punctured, suture and sides blackish brown, as are two streaks on elytra, outer largest and running from before the middle to near the end, the basal half very obscure, the inner before the middle and very short; femora somewhat ferruginous; tibiae and tarsi rather hairy.

Length, 6½ lines.

Hab. New Zealand (Port Nicholson).

*PHORACANTHA DORSALIS.*

*Phoracantha dorsalis*, *Newm. Ann. Nat. Hist. V. p. 19.*  
*Stenochorus dorsalis*, *Macleay, King's Survey, II. 451.*  
Hab. New Zealand, Dr. Sinclair. R.N.

*BRACHYTRIA LATEBROSA*, Var. *pallida*, *Pl. 4, fig. 4.*

*Brachytria latebrosa*, *Newm. Entomol. p. 95.*

In sculpture and form the New Zealand specimen agrees with the two individuals from Kangaroo Island, described

by Mr. Newman, l. c.; the antennæ and legs are more rufous, the stripe down the middle of the thorax is wider and lighter in colour; the elytra down the suture, at the tip and on the margin are widely margined with pale rufous, there is no iridescence on the elytra as in the type specimens.

Hab. New Zealand? (Port Nicholson), Capt. Parry.

#### COPTOMMA VARIEGATUM.

*Callidium variegatum*, *Fabr. Ent. Syst.* II. 325, 32. *Oliv. t. 5, f. 58.*

*Coptomma vitticolle*, *Newm. Ann. Nat. Hist. V. p. 18.*

Antennæ moderate, black, two last joints rust-coloured; head black, with two lines and a transverse stria, whitish; thorax smooth, above deep black, with four white, longitudinal lines, the sides with numerous minute, yellowish spots; elytra deep black, with three somewhat raised, longitudinal ridges, covered with many minute, yellow spots, most crowded on a transverse band about the middle, and two shortish oblique bands near the base; abdomen deep black on each side, with a double row of yellow spots, the inner the largest; legs black, femora of hind legs with a yellowish spot above.

Length,  $7\frac{1}{2}$  to  $11\frac{1}{2}$  lines.

Hab. New Zealand (N. & S. Islands).

#### COPTOMMA SULCATUM.

*Callidium sulcatum*, *Fabr. Ent. Syst.* II. 326, 34. *Oliv. t. 4, f. 48.*

*Tmesisternus*, *Guerin, Voy. Coq. II. 130.*

Antennæ short, brown; head ash-coloured, line on the forehead raised, smooth, black; thorax covered with ash-coloured hairs; elytra furrowed with black, smooth, raised lines and four white, villous furrows; legs griseous.

Hab. New Zealand, Mus. Banks.

#### COPTOMMA LINEATUM. *Pl. 4, f. 5.*

*Callidium lineatum*, *Fabr. Ent. Syst.* II. 325, 33. *Oliv. t. 4, f. 50.*

*Tmesisternus*, *Guerin, Voy. Coquille II. 130.*

Antennæ short, first joint much thicker than the rest, rust-coloured, the others blackish; head dark brown, with two white lines meeting in front; thorax with two broad, whitish lines; scutellum whitish; elytra bluish, rust-coloured, with four, whitish, impressed lines, the first on the outer margin, two in the middle joined together before reaching the tip, the fourth on the suture, these lines are filled with yellowish white hairs; abdomen with yellowish white hairs, each segment in the middle with a triangular, rust-coloured, smooth mark; legs somewhat rust-coloured, the ends of femora tipped with a steely black.

Length,  $8\frac{1}{2}$  to  $9\frac{1}{2}$  lines.

Hab. New Zealand.

#### COPTOMMA ACUTIPENNE. *Pl. 4, fig. 2.*

Head covered with grayish hairs, vertex with a smooth, somewhat raised line down the middle, and a similar line on the inside of each eye; thorax smooth in the middle,

the sides covered with yellowish hairs; elytra pointed at the end, a notch between the point and the suture, four impressed lines filled with yellowish white hairs, the first on the margin, the second running nearly to the tip, the third not connected at the end with the second, running a little beyond the middle, the fourth on the suture, but rising about one-third down; abdomen whitish beneath, a broad, dusky line down the middle; legs olive brown, base of femora yellowish.

The general colour is a deepish black, but in two specimens the elytra are of an olive green, and in one the thorax and head are of a deep rufous, without hairs, but this seems a rubbed specimen.

Length,  $4\frac{1}{4}$  to 6 lines.

Hab. New Zealand (Port Nicholson, &c.).

#### CALLIDIUM (?) DIVERSICORNE.

Antennæ with the third and fourth joints together as long as fifth, the fourth joint not half the length of the third (head and thorax crushed); femora very much clavated; elytra coarsely punctured at the base, more finely about the middle, and quite smooth at the end, very deep brown, a longish testaceous mark on the suture at the base, four longish, oval, testaceous spots across the elytra, which, if continued would form a cross, a small spot close to the shoulder, a longish, testaceous line on the margin just before the middle, a large testaceous spot near the tip; club of femora deep brown, base yellowish, tibiae black at the end, yellow at the base.

Length, 5 lines.

Hab. New Zealand.

#### OBRIUM FABRICIANUM.

*Obrium Fabricianum*, *Westw. Arc. Ent. II. 28* (not *O. minutum*, *Auct.*).

*Callidium minutum*, *Fabr. Ent. Syst.* II. 332, 60. *Oliv. t. 5, f. 56.*

*Clytus minutus*, *Fabr. Syst. El. I. 346.*

Antennæ moderate, first joint testaceous, the rest white at the base, black at the tip; head, thorax, elytra and legs testaceous; elytra before the middle with a white band, which does not reach the suture; femora much clavated, white at the base.

Hab. New Zealand,—Mr. Colenso.

#### OBRIUM GUTTIGERUM.

*Obrium guttigerum*, *Westw. Arc. Ent. II. 28. t. 56, fig. 4.*

Violet-coloured, shining; elytra more purple, somewhat tuberculated at the base, each with a large rounded, slightly raised spot in the middle; all the joints of the antennæ at the tip, and the clubbed tips of the femora black; head in front tawney purple; trophi short, reddish; tips of the short mandibles black; thorax elongated before and behind, the middle much narrowed, in the middle rounded, gibbous; tibiae and tarsi pale testaceous.

Hab. New Zealand (Port Nicholson).



## ÆMONA, Newman.

*Æmona, Newman, Ent. p. 8.*

Appearance of Clytus; head scarcely prone, immersed in the prothorax almost up to the eyes, elongated in front; eyes reniform, dilated behind; antennæ scarcely longer than the body, filiform, eleven-jointed, third and fourth joints somewhat shorter than the following; thorax without spines, longer than wide, the sides nearly parallel, transversely wrinkled on the disk; elytra flattened on the back, gradually attenuated towards the tip, the tip itself rounded; legs somewhat elongated; femora simple.

## ÆMONA HUMILIS.

*Æmona humilis, Newman, Ent. p. 8.*

Chestnut; eyes, tips of femora and tarsi brown; crown of head densely covered with golden hairs, longitudinally divided down the middle by a smooth line; scutellum downy, coloured; elytra deeply punctured, closely covered with gray hairs.

Hab. New Zealand, C. Darwin, Esq.

## TETROREA, White.

Head notched between the antennæ; antennæ with the fourth joint longest and slightly curved, each joint ciliated on the inside; thorax short, rather longer than wide, with four tubercles, two transverse in the middle, two larger, one on each side; elytra elongated, at the base abruptly inserted, the shoulder angled, and between the shoulder and the suture there is a tubercle, end of elytra bluntish; legs, with the femora very thick.

A new subgenus of *Lamia*, closely allied to *Hypsioma*.

TETROREA CILIPES. *Pl. 4, fig. 9.*

Elytra at the base and on the margin punctured, a line of punctures close to the suture extending to the middle of elytra, near which, on each side, is a small tuft of light-coloured hairs; head and thorax with ochrey hairs; antennæ gray, sprinkled with brown; base of elytra deep brown, with two streaks of yellowish hairs, elytra yellowish brown, on the sides spotted with blackish, near the apex is an oblique, gray spot, sprinkled with black, the fore part margined with a curved line, white in front and ochrey behind; under side of abdomen dark gray, four of the segments with a yellow spot on each side; tibiae on each side near the base with two or three tufts of whitish hairs.

Length,  $6\frac{3}{4}$  to 7 lines.

## LAMIA (AMNISCUS?) FLAVIPES.

Thorax much wider than long, with a strong, somewhat recurved spine behind; head and thorax with yellowish hairs, in some parts rather deeply punctate; base of elytra punctate, in the middle of each a tubercular wart, elytra covered with close, grayish hairs, amongst which are some short, stiffish hairs of a darker colour; four of the segments of abdomen beneath with four largish, yellow marks on each on a black ground; basal joint of antennæ and femo-

ra gray, with small black spots, other joints of antennæ yellow at base and dusky at the tips; tibiae and tarsi yellowish.

Length, 7 lines.

Hab. New Zealand, Capt. Parry.

## LAMIA CRISTA.

*Lamia crista, Fabr. Ent. Syst. II. 268, 6. Oliv. t. 14, f. 101.*

Antennæ rather longer than the body, ash-coloured, joints black at the tip; thorax on both sides armed with a sharp spine and beneath the spine a fulvous point; elytra in front griseous, with a large, compressed, three-toothed tubercle, behind palish, with a small, oblique, black streak; femora clavate, black, club griseous; tibiae griseous, black at the tip.

Length, 8 lines.

Hab. New Zealand, Mus. Banks, Mus. Brit.

A very small species, which seems to come near *Hebecerus*.

## LAMIA (HEXATRICHA) PULVERULENTA.

*Lamia pulverulenta, Westw. Arc. Ent. II. 86, t. 56, f. 5.*

Obscure, powdered with white; head rather elongated behind the eyes, front part nearly perpendicular, behind with two whitish lines; palpi short, with the extremity somewhat pointed; antennæ eleven-jointed, third joint the longest, first six joints fringed on the outside with hairs, alternately coloured as the joints themselves, the bases of which are white and the extremities black; thorax nearly rounded, sides unarmed; elytra convex, humeral angles prominent, hind part much attenuated and deflexed, the tips not spinose but pilose, along each run four slender, fulvous, elevated costæ, which do not extend to the tip, the middle of the elytra ornamented with two interrupted, black fasciæ; legs varied with black and whitish colours; extremity of tibiae externally pilose.

Length, 8 to 9 lines.

Hab. New Zealand (Waikouaiti). Mr. Earl also found it in the N. Island, at Port Nicholson: in the specimens sent from the latter locality, the markings are by no means so distinct.

ISODERA VILLOSA. *Pl. 4, fig. 1.*

*Saperda hirta, Fabr. Ent. Syst. II. 309, 10.*

*Saperda villosa, Fabr. Syst. El. 320, 13.*

Antennæ brown, as long as the body; head griseous, four spots on the base yellowish; thorax transversely wrinkled; elytra ferruginous, rough, with griseous hairs, blunt at the end; legs griseous.

Length, 9 to 12 lines.

Hab. New Zealand, Mus. Brit.

This species I cannot refer to any of the numerous genera lately established. The antennæ are somewhat flattened; the thorax is longer than wide, nearly cylindrical, above it is transversely striated; the elytra are elongated,

the sides nearly parallel, the end rounded; legs long, simple, anterior femora subclavate; the middle and hind tibiae somewhat flattened. (*Isodera*, *White*).

*AGAPANTHIDA*, *White*.

Head somewhat notched between the antennae, palpi rather long, antennae scarcely the length of body, all the joints but the second nearly of the same length; thorax spined on the side, rather broader than long, somewhat rounded in front, truncated behind; elytra elongated, slightly narrowed behind the base; femora clavated.

*AGAPANTHIDA PULCHELLA*. *Pl. 4, fig. 10*.

Covered with palish gray, somewhat silky scales; base of elytra with a roundish black spot on suture, in front margined with deep yellow hairs, across the middle of elytra there is an irregular, blackish band, not reaching the margin, and interrupted in the middle, and a diagonal line of yellow hairs near the end, with two black lunules behind each, separated by a short, yellow line; thorax with two black spots above, one on each side; base of the joints of antennae, beginning at the third, yellow; basal half of femora yellow.

Length, 6 lines.

Hab. New Zealand (*Waikouaiti*), Mr. Earl.

*DORCADIDA*, *White*.

Antennae with all the joints but the first slender, very slightly thickened at the end; thorax longer than wide, very straight behind and in front, upper parts and sides with a few tubercles, the sides have a largish, pointed tubercle on each side; elytra pointed at the end, leaving between them a deep notch; legs and tarsi rather slender.

This, *Cerægidion* and *Microtragus* (*White*, Appendix to *Stoke's Voyage of the Beagle*), are closely allied to *Dorcadion*.

*DORCADIDA BILOCULARIS*. *Pl. 4, fig. 11*.

Dark brown, covered with very short, thickly placed, yellowish gray hairs; a roundish space in the middle of the thorax and longitudinal line down the middle free from tubercles; elytra with a serrated, raised keel near to, and parallel with, the outer margin, down the middle of each elytron is a tubercular, raised keel, obsolete towards the tip of elytra and in the centre enclosing an oval space; under side of body yellowish, sprinkled with black spots and a wideish black line down the middle of abdomen.

Length, 7 to 8½ lines.

Hab. New Zealand (*Port Nicholson*), Capt. Parry.

*XYLOTOLES*, *Newman*.

*Xylotoles*, *Newman*, *Ent. p. 12*.

Head prone, antennae longer than the body, slender, eleven-jointed; thorax nearly cylindrical, straight on the sides; elytra of much the same width as the thorax, convex on the sides, pointed at the end; legs moderate; femora swollen at the end.

*XYLOTOLES GRISEUS*.

*Xylotoles griseus*, *Westw. Arc. Ent. II. 27, t. 56, f. 2*.  
*Saperda grisea*, *Fabr. Syst. Ent. 168, Syst. El. II. 324*.

*Xylotoles lentus*, *Newm. Ent. 12?*

*Lamia heteromorpha*, *Boisd. Voy. Astrol. t. 9, f. 14?*

Griseous; margin of scutellum and some very short lines on elytra yellowish, base with impressed dots, tip scarcely acuminate; legs brown; femora clavated; antennae brown.

Hab. New Zealand (*Bay of Islands*), on flowers.

*XYLOTOLES SUBPINGUIS*.

Grayish brown, sprinkled with dusky spots; scutellum yellowish; some spots on the thorax void of hairs; each elytron near the base with three small yellowish specks; antennae sprinkled with minute, brown dots.

Hab. New Zealand (*S. Island*), Mr. Earl.

*XYLOTOLES GRACILIS*.

Slender, with a grayish pubescence sprinkled with brown spots and a lunated, brown mark across the middle of the elytra; thorax nearly as wide as long.

Hab. New Zealand (*Port Nicholson*), Capt. Parry.

*XYLOTOLES PARVULUS*.

Testaceous, covered with a grayish pubescence; base of elytra with several dots and four rows of small punctures in two lines, extending to the middle of elytra.

Hab. New Zealand (*Port Nicholson*), Capt. Parry.

In Capt. Parry's collection there is another species smaller than the preceding, but so much rubbed and broken that I cannot describe it.

*XYLOTOLES BIMACULATUS*.

Smooth, with two transverse, impressed lines on thorax, one in front and one behind, middle of the thorax above bulging; the whole insect is of a rich brown colour, the margins and posterior half of elytra covered with grayish down, some spots free from it, a large depressed mark on the basal part of each elytron covered with yellowish hairs.

Hab. New Zealand (*Port Nicholson*), Capt. Parry.

*XYLOTOLES LYNCEUS*.

*Saperda lyncea*, *Fabr. Ent. Syst. II. 313, 27*.

Head black; antennae brown, as long as body; thorax black on each side, with a rust-coloured point; scutellum rust-coloured; elytra griseous, base punctato-striated, tip acuminate, diverging; body black; abdomen on each side with four rust-coloured spots; legs brown; femora clavate.

Hab. New Zealand (*Port Nicholson*), Mr. Earl.

*XYLOTOLES LETUS*.

Base of the elytra with several punctures, margin of suture with a few depressed warts; head and antennae ferruginous, with many grayish hairs, joints of the former (from the fourth) ringed with black at the end; thorax shining violet, somewhat rough on the sides, with some spots co-

vered with yellowish hairs; elytra shining green, sprinkled over with short, gray hairs, scutellum and a few small spots across the elytra covered with yellow hairs; abdomen beneath smooth, polished, deep brown; the sides spotted with yellow; legs somewhat violet, with short, gray hairs.

Hab. New Zealand (Port Nicholson), Capt. Parry.

#### PARMENA ANTARCTICA.

Thorax thickly punctured; base, sides and sutural margin of elytra punctured, on each elytron are two small tufts of hair placed longitudinally; the whole of the insect is clothed with a grayish pubescence, amongst which are some longer and stiffer hairs; across the middle of each elytron is a triangular, black spot, extending to the posterior of the tufts, a large, triangular mark common to each elytron at the tip; antennæ and tibiæ banded with brown.

Hab. New Zealand (Port Nicholson), Capt. Parry.

#### CALLIPRASON, White.

Calliprason, *White, Dieffenbach's New Zealand*, II. 277.

Head behind the eyes not wider than the thorax; eyes very large, prominent, very slightly (if at all) notched near the insertion of the antennæ; antennæ eleven-jointed, first joint longest, dilated at the end, second minute, third, fourth and fifth the most slender, third and fourth knobbed at the end, the fifth gradually, and the terminal joints slightly, dilated; thorax longer than broad, narrowed in front and behind, sides with a short spine behind the middle; legs long, slender; femora clavate; elytra long, gradually growing narrower towards the end, which is simple.

#### CALLIPRASON SINCLAIRI. *Pl. 4, fig. 3.*

Calliprason Sinclairi, *White, l. c.*

Stenoderus Sinclairi, *Westwood, Arc. Ent.* II. p. 27, *t. 56, f. 3.*

Above grass-green, beneath silvery gray, with silky scales or hairs; abdomen reddish brown, where seen through silvery gray; legs, antennæ and cibarial organs reddish; parts about the mouth with gray hairs; head and thorax above darker than the elytra, in some places inclined to blackish; elytra strongly margined, margin yellowish brown, upper surface minutely punctured, with three rather indistinct, longitudinal ridges.

Length,  $4\frac{1}{2}$  lines.

Hab. New Zealand.

#### CALLIPRASON MARGINATUM. *Pl. 4, fig. 6.*

Thorax above in the middle with two little spines, a wish space down the middle transversely and irregularly striated; elytra above very flat and thickly but not deeply pitted, the sides gradually tapering from the base to the tip; head above in the middle and two lines on the thorax, one on each side, with short, yellow hairs, rest of head and thorax deep brown; elytra deep, dull green, with a long,

narrow line of yellow on the side close to the margin and extending from the shoulder to near the tip; legs rufous.

Length,  $9\frac{1}{2}$  lines.

Hab. New Zealand, W. W. Saunders, Esq.

#### Family CHRYSOMELIDÆ.

##### COLASPIS BRUNNEA.

*Chrysomela brunnea, Fabr. Ent. Syst.* II. 323, 75.

Thorax smooth, shining, with two blackish green spots; elytra testaceous, punctate, suture, and oblique line from the suture blackish green, under side deep black; legs yellow; this species varies much in colour; the above is the description of the variety known to Fabricius; in some, the spots on the thorax are very obscure; the elytra are testaceous, with a greenish hue; legs and under side of a uniform testaceous; in others the whole of the insect is deep black, with a greenish hue, the femora at the base being ferruginous and the antennæ tinged with the same.

Hab. New Zealand, on the flowers of the *Leptospermum*.

##### COLASPIS PALLIDIPENNIS.

Deepish brown, with pale ochrey elytra and legs; head behind with a black band, between the eyes a testaceous band, with a slight, impressed line in the middle; thorax deepish brown, margined with testaceous, thickly and closely punctured; elytra pale ochrey, the margin of suture deep brown, the basal half very closely and irregularly punctured, the apical portion and margin with the punctures in lines; under side of body black; the legs pale ochrey.

Length,  $1\frac{1}{2}$  line.

Hab. New Zealand.

#### Family COCCINELLIDÆ.

##### COCCINELLA TASMANI.

Very deep black, spotted with yellow; head black, with two small angular yellow spots between the eyes, one close to each eye; thorax with a large, square yellow spot on each anterior angle; elytra with seven yellow spots, two at the base somewhat elongated, one on the shoulder, the other near the suture, next two before the middle, the outer close to the margin, almost divided into two, the inner near the suture and sharpish above, two beyond the middle, outer next the margin and sharpish below, the last at the tip; under side and legs black.

Length, 2 lines.

Hab. New Zealand.

Note to p. 9.

"LUCANUS (PRIONUS?) ANTILOPE."

Lucanus (Prionus?) Antilope, *Kirby, Zool. Journ.* II. 70, *Pl. 1, f. 7.*

Mandibles taken from a string of green beads, &c., brought from New Zealand, "now in the collection of R. D. Alexander, Esq., F.L.S., of Ipswich." *Kirby, l. c.* (1825).

## Order DICTYOPTERA.

## Family FORFICULIDÆ.

FORFICULA LITTOREA, *Pl. 6, figs. 4, 5.*

Deep blackish brown, with fulvous legs; head somewhat triangular, the sides behind the eyes rounded, very deep blackish brown; labrum, cibarial organs and antennæ fulvo-testaceous; two fulvous spots on the head, one close to the inside of each eye, a short, fulvous line on the middle of the hind part; antennæ with at least nineteen joints, first joint the longest, second very short, third three times the length of second, fourth a little longer than the second, the others gradually increasing in length; prothorax square, fulvous in front, with a short, impressed line in the middle; abdomen widest about the seventh joint, deep blackish brown, the margins slightly fulvous, last segment of abdomen large, with some wide, longitudinal lines above, the forceps short, slightly hooked at the end, with two or three sinuations on the inner edge; legs fulvous, tarsi without apparent pads. Apteroous.

Hab. New Zealand (under stones on the beach).

## Family BLATTIDÆ.

There are two species of Blattidæ at least found in New Zealand, both, probably, introduced by ships.

## Order ORTHOPTERA.

## Family PHASMIDÆ.

PHASMA (ACANTHODERUS) HORRIDUS. *Pl. 5, fig. 4.*

Head gray, a slight ridge with four sinuations behind the antennæ and between the eyes, two spines and two or three tubercles on the vertex; prothorax gray, with several small, irregular tubercles, meso- and meta-thoraces brown, with many longish spines, especially on the sides and under parts, there are several tubercles on the upper parts; abdomen on the under side with spines shorter than those on the thorax, the upper parts with several subspiniform tubercles, fourth and sixth segments dilated on the sides at the end; coxæ of fore legs with four or five spines, coxæ of middle and hind legs with two spines; femora sharply angled, some of the angles with a few teeth, a crested dilatation at the base of the tibiae of two hind pairs, basal joints of tarsi of two hind pairs of legs crested, with a notch at the end.

Length, 5 inches 9 lines.

Hab. New Zealand.

## PHASMA (ACANTHODERUS) SPINIGER.

Head greenish gray, a broadish protuberance between the eyes, vertex smooth; antennæ grayish, ringed with brownish; prothorax greenish gray, smooth, mesothorax narrow, green, cylindrical, with about eighteen strong spines, placed somewhat in pairs, nine on the upper and nine on the under side, brownish black at the end, metathorax green, narrow, cylindrical, with three spines above and eight below; abdomen subcylindrical, the joints thickened, first segment with two spines in the middle on

the under side; fore legs (broken off), two hind pairs grayish, with six wide brown bands; femora white at the base, with two short spines at the very end and two longer on the inside near the tip; tibiae with a slight tooth on the outside near the base.

Length, 3 inches 7 lines.

Hab. New Zealand, Dr. Sinclair, R.N.

PHASMA HOOKERI. *Pl. 6, fig. 6.*

Green; an oblique crest between the eye and the base of the antennæ, somewhat knobbed in front, a very narrow black line on the vertex, two black lines on the throat; head and thorax smooth; prothorax smooth, with a narrow black line down the middle, mesothorax with a black line down the middle in front, and a shorter black line in the middle behind, metathorax with a black line down the middle in front; legs sharply angled, the femora with one of the angles serrated, the serratures distant; tibiae without serratures; antennæ black, two first joints yellow.

Hab. New Zealand.

## Family MANTIDÆ.

There is at least one species of Mantis found in New Zealand. I have seen the egg case of a species brought by Dr. Sinclair.

## Family ACHETIDÆ.

DEINACRIDA HETERACANTHA. *Pl. 5, fig. 1.*

Deinacrida heteracantha, *White in Gray's Zool. Misc. 1842, 78, Dieffenb. New Zeal. I. p. 280.*

Hind legs nearly twice the length of the insect; tibiae quadrangular, broadest behind, the edges behind armed with ten spines, coming out alternately, spines very strong and sharp; body brown, beneath yellow; head punctured on the vertex; antennæ at least two-and-a-half times the length of the insect; thorax, especially the prothorax punctured, with some smoothish spaces in the middle, lateral margins slightly thickened; head not so wide as the thorax; labial palpi with the terminal joint swollen at the end, when dry it is slightly compressed from shrinking, maxillary palpi very long, three last joints cylindrical, last longest, gradually clubbed at the end; prosternum with two spines approximating in the middle, meso- and metasterna deeply grooved behind, with a strong tooth on the sides behind.

Described from a male specimen presented to the British Museum by Dr. Dieffenbach, measuring from the forehead to the end of the abdomen, exclusive of appendages, two inches; from the end of the tarsus of hind leg to the end of antennæ stretched out it measures at least 12½ inches. Dr. Andrew Sinclair has presented a specimen of a female, which, with its hind legs and antennæ extended is at least 14 inches long; its head and body, exclusive of appendages, being 2½ inches, its ovipositor is rather more than an inch long, is slightly bent upwards and compressed through the greater part of its length, the two blades being somewhat angular at the base; nearly the



whole insect is of an ochry yellow colour, the end of the ovipositor, and the extreme tip of the spines on the legs being brown; the margins of the abdominal segments are of a lighter colour; the transversely-ridged and rough-surfaced femora have many light coloured streaks. The greater portion of the dorsal part of the thorax is somewhat ferruginous. This specimen was found by itself on the Marsh Pine in Waiheké, in the Fifth of Thames. Five other specimens of smaller size Dr. Sinclair found congregated under bark of trees. The Deinacrida, according to the Maories, generally keeps high up on the trunk, which the natives are afraid to climb, as the insect, especially the dark-headed, long-jawed male, bites severely.

Type. B.M.

#### HEMIDEINA THORACICA.

♂ *Deinacrida thoracica*, *White, Zool. Erch. & Terror, tab. 5, f. 2* (1845).

*Hemideina thoracica*, *Walker, Cat. Dermapt. Salt & Blatt, Suppl., p. 162, n. 2* (1869).

♂, ♀ *Hemideina producta*, *Walker, l. c. p. 163, n. 5* (1869).

Hab. New Zealand (*Ross, Pelerin, Smith, Bolton, Drew*).

Type. B.M.

I am satisfied that *H. producta* can be nothing but *H. thoracica* discoloured (probably through spirit), it agrees precisely in structure with *H. thoracica*, but the thorax and legs, instead of being entirely testaceous or ochraceous are clouded with piceous.

#### Order NEUROPTERA.

##### Family LIBELLULIDÆ.

#### PETALURA CAROVÆ Tab. 6, figs. 1, 1a.

*Petalura Carovæ*, *White, Diff. N. Zool. II., App., p. 281, n. 97* (1843).

Auckland (*Sinclair*). Type. B.M.

#### CORDULIA SMITHII.

*Cordulia Smithii*, *White, Zool. Erch. & Terror, tab. 6, f. 2* (1845); *De Selys-Longchamps, Synopsis des Cordul. (Acad. roy. sci. Belg.), p. 27, n. 11* (1871).

*Cordulia Novæ-Zelandiæ*, *Brauer, Verh. Zool. botan., Wien. (1865); Voy. Novara, pl. II., f. 3* (1865).  
New Zealand, Auckland. Type. B.M.

#### Family AGRIONIDÆ.

##### LESTES COLENSONIS.

♂ *Agrion Colensoni*, *White, Zool. Erch. & Terror, tab. 6, f. 3* (1845).

♂, ♀ *Lestes Colensoni*, *De Selys-Longchamps, Synopsis Agrionines (Acad. roy. sci. Belg.), p. 44, n. 41* (1862).

New Zealand.

Type. B.M.

Described in full by De Selys, who states that it is certainly allied to *L. gracilis* in its anal appendices.

#### Family TERMITIDÆ.

##### CALOTERMES INSULARIS.

*Termes insularis*, *Walker, List Neuropt. Ins. III., p. 521, n. 28* (1853); *White Ms., tab. 7, f. 11*.

*Calotermes insularis*, *Hagen, Monogr. Termit. Linnæa Entomol. XII., p. 42, n. 2* (1858).

New Zealand (*Sinclair*).

Type. B.M.

According to Dr. Hagen, this species, in form, size and colour, stands very near to *C. castaneus*.

#### Order HEMIPTERA (HETEROPTERA).

##### Family OXYNOTIDÆ.

##### (ECHALIA SCHELLENBERGII.

*Pentatoma (Arma) aculeata*, *White Ms., tab. 7, f. 2*.

*Pentatoma Schellenbergii*, *Guerin, Voy. Cog. Zool. II., Ins. p. 168, pl. 11* (1830).

*Echalia Schellenbergii*, *Stål, Stett. Ent. Zeit. XXIII., p. 93*.

*Arma Schellenbergii*, *Walker, Cat. Hemipt. Heteropt. I., p. 140, n. 39* (1867).

*Pentatoma consocialis*, *Boisduval, Voy. de l'Asiatic, II., p. 630, pl. 11, f. 9* (1833).

*Arma ? Schellenbergii*, *Dallas, List Hemipt. Ins. I., p. 89* (1851).

*Rhaphigaster perfectus*, *Walker, Cat. Hemipt. Heteropt. II., p. 371, n. 83* (1867).

New Zealand (*Ross, Sinclair, Bolton*). B.M.

##### CERMATULUS NASALIS.

*Pentatoma (Jalla) diffinis*, *White Ms. tab. 7, f. 4*.

*Ælia nasalis*, *Hope, Cat. p. 32* (1837).

*Cermatulus nasalis*, *Dallas, List. Hemipt. Ins. I., p. 106, n. 1; pl. II., f. 3* (1851).

*Asopus nummularis*, *Erichson, Arch. für. Naturg. VIII., p. 276, n. 258* (1842).

*Rhaphigaster Pentatomoides*, *Walker, Cat. Hemipt. Heteropt. II., p. 370, n. 81* (1867).

New Zealand (*Sinclair, Earl, Pelerin, Lort, Bolton*). B.M.

#### Family CYDNIDÆ.

##### ÆTHUS LEPTOSPERMI, n. sp.

*Cydnus Leptospermi*, *White Ms. tab. 7, f. 3*.

*Æthus Leptospermi*, *Dallas, List Hemipt. Ins. I., p. 119, n. 22* (1851).

Ovate, glabrous, head, thorax and first two or three segments of abdomen sparsely fringed with rather long bristles; head semicircular in front; with distinct

marginal ridge; thorax smooth; scutellum large, almost equilateral, the base rather shorter than the sides.

Above pitchy, corium of hemelytra and antennae paler; thorax below blackish, legs castaneous.

Length  $2\frac{1}{2}$  lines.

New Zealand (*Richardson, Ross, Sinclair*). Type. B.M.

The type is said to have been taken "on *Leptosperm* bushes."

#### Family SCIOCORIDÆ.

##### DICTYOTUS POLYSTICTICUS, n. sp.

*Sciocoris polystictica*, *White Ms.*, tab. 7, f. 5.

*Dictyotus polystictica*, *Dallas List Hemipt. Ins.* I., p. 141, n. 5 (1851).

Same general form as *D. affinis* of Dallas, the thorax wider, clypeus distinctly notched; densely punctured, clay coloured, more brightly above than below; abdomen black above, marginal ridge spotted with clay colour; basal two-thirds of wings dusky, costal and internal veins black; head, thorax, and legs below irrorated with fuscous granules; antennae, basal joints clay coloured, apical joints black.

Length  $4\frac{1}{2}$  lines.

New Zealand (*Sinclair, Hooker*).

Type. B.M.

#### Family PENTATOMIDÆ.

##### RHOPALIMORPHIA OBSCURA. Tab. 7, fig. 8.

*Rhopalimorphia obscura*, *White in Dallas, List. Hemipt. Ins.* I., p. 293, n. 1 (1851).

New Zealand (*Sinclair, Hooker*).

Type. B.M.

##### ACANTHOSOMA VITTATUM.

*Acanthosoma bimaculatum*, *White Ms.*, tab. 7, f. 1.

*Cimex vittatus*, *Fab., Ent. Syst.* IV., p. 104, n. 96 (1794).

*Acanthosoma vittatum*, *Dallas, List. Hemipt. Ins.* I., p. 307, n. 13 (1851).

New Zealand (*Earl*).

B.M.

#### Family LYGEIDÆ.

##### NYSIUS ZEALANDICUS.

*Rhopalus Zealandicus*, *White Ms.*, tab. 7, f. 6.

*Nysius Zealandicus*, *Dallas, List. Hemipt. Ins.* II., p. 552, n. 1 deser. (1852).

*Nysius* (*Rhyphodes*) *Zealandicus*, *Stal, Hemipt. Fabric.* I., p. 76.

*Lygaeus clavicornis* (ad partem), *Fab., Ent. Syst.* IV., p. 169, n. 117 (1794).

*Coreus clavicornis*, *Fab., Syst. Rhyn.* p. 201, n. 48 (1803).

New Zealand (*Ross, Sinclair*).

Type. B.M.

#### Family PIRATIDÆ.

##### PIRATES EPHIPPIGER. Tab. 7, fig. 7.

*Reduvius* (*Pirates*) *ephippiger*, *White, Dieff. N. Zoa.* II., App., p. 283, n. 108 (1843).

*Pirates ephippiger*, *Walker, Cat. Hemipt. Heteropt.* VII., p. 126, n. 100 (1873).

*Brachysandalus ephippiger*, *Stal, Ofv. Kongl. Vetensk. Akad. Förhandl.* XXIII., p. 260.

New Zealand (*Sinclair*).

Type. B.M.

The following Hemiptera from New Zealand are also in the collection of the British Museum—

*Callidea imperialis*, *Platycoris immarginatus*, *Pentatomia vilis*, *Rhopigaster prasinus*, *R. Amyoti*, *Lygaeus pacificus*, *Lygaeus ruficollis*,\* *Rhyparochromus inornatus*, *Capsus laticinctus* (*C. ustulatus*), *Leptomercoris Maoricus*, *Crimia attenuata* (*Mezira Maorica*), *Aradus thoracicus*. *Phymata Feredayi* & *conspicua* and *Aradus Hochstetteri* are desiderata.

#### Order HEMIPTERA (HOMOPTERA).

##### Family APHIROPHORIDÆ.

##### (APHIROPHORIDÆ, *Am. & Scrv.*)

##### PTYELUS SUBVIRESCENS, n. sp.

*Aphrophora subvirescens*, *White Ms.*, tab. 7, f. 9.

*Ptyelus subvirescens*, *Walker, List. Homopt. Ins.* III., p. 718, n. 33 (1851).

Same general form as *P. bifasciatus*; ochraceous above and below; legs and hemelytra pale greenish testaceous; wings hyaline white.

Length,  $3\frac{1}{2}$  lines: expanse,  $6\frac{1}{2}$  lines.

New Zealand (*Ross*); Auckland (*Bolton*).

Type. B.M.  
*P. pingens* of Walker may possibly be a variety of this species.

##### PTYELUS TRIMACULATUS, n. sp.

*Aphrophora trimaculata*, *White Ms.*, tab. 7, f. 10.

*Ptyelus trimaculatus*, *Walker, List. Homopt. Ins.* III., p. 718, n. 32 (1851).

Similar in form to the preceding, the head rather narrower and consequently more transverse; dark testaceous; the prothorax bordered on each side by a black spot; hemelytra pitchy, becoming paler at the margins: an oblique subbasal semicircular streak (curving from near base to middle of costal area), an almost semicircular patch on costal margin towards apex, and a diffused triangular spot on inner margin near external angle, all creamy whitish; wings hyaline white, iridescent, the nerveless border slightly fuscous, veins blackish; legs pale testaceous, tarsal joints black-edged.

Length,  $3\frac{1}{2}$  lines; expanse,  $7\frac{1}{2}$  lines.

New Zealand (*Sinclair, Hooker*); Auckland (*Bolton*).

Type. B.M.

\* Not a *Lygaeus*.

## Order HYMENOPTERA.

## Family ANDRENIDÆ.

## DASYCOLLETES METALLICUS.

*Andrena trichopus* *White Ms., tab. 7, f. 12.*

*Dasycolletes metallicus*, *Smith, Cat. Hymen. Ins. I., p. 15, n. 1 (1853).*

New Zealand.

Type. B.M.

## Family LARRIDÆ.

## TACHYTES NIGERRIMUS.

*Astata nigerrima*, *White Ms., tab. 7, f. 14.*

*Tachytes nigerrimus*, *Smith, Cat. Hymenopt. Ins. IV., p. 302, n. 26 (1856).*

New Zealand.

Type. B.M.

## Family MYRMICIDÆ.

## APHENOGASTER ANTARCTICA.

*Formica antarctica*, *White Ms., tab. 7, f. 13.*

*Atta antarctica*, *Smith, Cat. Hymenopt. Ins. VI., p. 167, n. 21 (1858).*

*Aphenogaster antarctica* *F. Smith, in Coll. Brit. Mus.*

New Zealand.

Type. B.M.

## Family ICHNEUMONIDÆ.

*Mesoleptus* *Mülleri*, n. sp. See *postea* (woodcut), *fig. 2.*

Allied to *M. atomator*; head black; mouth orange; antennæ long, black; thorax black; abdomen glossy orange tawny, basal two-thirds of first segment black; legs orange tawny; wings hyaline, with green and rosy reflections; costal stigma black.

Christchurch (*Wakfield*).

Parasitic upon *Cacoccia gallicoleus*.

## Order DIPTERA.

## Family TIPULIDÆ.

*Tipula* *Senex*, n. sp. *Tab. 7, fig. 15.*

Head pale cinereous, with basal fourth and a central oval depression testaceous; prothorax testaceous, with central longitudinal ridge, two lateral longitudinal cinereous bands; mesothorax and metathorax cinereous, with central and lateral longitudinal dusky bands; abdomen fulvous; indications of dusky bands of metathorax continued into basal segments; wings hyaline white; costa to mediastinal vein stramineous; veins testaceous; costa, a spot at first third of discoidal cell, two obliquely just beyond second third, a fourth near apex, and a nebulous

striole at apex of cell, brown; halteres pale testaceous, legs testaceous; pectus pinkish cinereous, with several dusky spots.

Expanse, 2 inches.

New Zealand (*Sinclair*).

Type. B.M.

## Family BERIDÆ.

## (XYLOPHAGI, Wlk.)

## DIPHYSA APICALIS, n. sp.

*Beris apicalis*, *White Ms., tab. 7, f. 17.*

Body shining ochreous with black lateral line, trimaculate on the thorax; eyes brown, front white, antennæ brownish at base, otherwise black; palpi and proboscis ochreous; terminal segments of abdomen more or less dusky, distinctly shot with purple (as also are the other segments, but less evidently); legs ochraceous or tawny, tarsi of front pair blackish, of middle and hind pairs pale testaceous; pectus castaneous; abdomen below paler than above; wings sordid hyaline white; a diffused brown spot filling areolet between subcostal and radial veins, and a smaller spot on first cubital vein.

Expanse, 8 lines.

New Zealand.

Type. B.M.

## Family STRATIOMIDÆ.

ODONTOMYIA DORSALIS. *Tab. 7, fig. 16.*

*Odontomyia dorsalis*, *Walker, List. Dipt. Ins. III., p. 536 (1849).*

New Zealand (*Sinclair*).

Type. B.M.

## Family SYRPHIDÆ.

## HELOPHILUS TRILINEATUS.

*Eristalis trilineatus*, *Wied. Auss., Zweif. II, p. 168. Tab. 7, f. 19.*

*Syrphus trilineatus*, *Fab., Syst. Ent., p. 766, n. 16.*

Port Nicholson (*Earl*); New Zealand (*Sinclair*, *Peterin, Bank*).

Type. B.M.

## Family MUSCIDÆ.

## MUSCA LEMICA.

*Musca* (*Sarcophaga*) *Lemica* *White Ms., tab. 7, f. 18.*

*Musca Lemica*, *Walker, List. Dipt. Ins. IV., p. 906 (1849).*

New Zealand (*Sinclair*).

Type. B.M.

## ORDER LEPIDOPTERA.

The Lepidoptera of New Zealand: by Arthur Gardiner Butler, F.L.S., F.Z.S., &c.

About a year ago Dr. W. L. Buller urged upon me the desirability of making a list of New Zealand Lepidoptera; but I was at that time unable to undertake it, being busily engaged with my "Lepidoptera Exotica" and with various papers on *Myriopoda* and *Arachnoidea*: recently however Dr. J. E. Gray very kindly intrusted me with the preparation of the Lepidopterous portion of the "Erebus and Terror." I thought, therefore, I might as well make a complete list, and thus supply the want which Dr. Buller, Mr. Fereday, and others have so long deplored.

Notwithstanding what Mr. Fereday says about the numbers of Moths in New Zealand, I cannot but agree with Mr. Bathgate that it is unusually poor in *Lepidoptera*, not "as compared to a tropical country," but as compared to Europe; still it is evident that Captain Hutton has (as regards the Diurnal Lepidoptera at any rate) underrated its productive powers; he says in his paper on "the Geographical relations of the New Zealand Fauna"—

"Of the Lepidoptera I know hardly anything, and prefer waiting until Mr. Fereday has published his promised descriptions of the species, before examining their bearing on the present subject. But one fact stands out prominently, viz., that out of more than three hundred species, only eight belong to the butterfly section." Trans. N. Zeal. Inst. V., p. 247 (1873), and Ann. & Mag. Nat. Hist. Febr. (1874). Now if we turn to Mr. Fereday's paper (Trans. N. Zeal. Inst. IV., pp. 216, 217) we find the following passage—"Although I have had but little time or opportunity I have collected, of butterflies at least \* eight, and of moths quite 300 different species," and he goes on to enumerate no less than eleven apparently distinct species with which he is familiar; if *Hamadryas zoilus* be really a New Zealand insect, the number of butterflies will then be twelve instead of eight; and all these Capt. Hutton should have admitted into his statement. Mr. Fereday has, I believe, noticed quite recently the occurrence of *Danaus Bernice* in New Zealand; the species will, of course, be *D. Archippus*, now common in Australia and the South Seas.

Most of the New Zealand Lepidoptera, as one might have expected, seem to be grass-feeders; some of them indeed of enormous size (*Charagia*, *Leto*, *Porina*); they are as a rule of dull colours, although *Chrysophanus Boldenarum* the most beautiful, though one of the smallest species of the genus, is a notable exception to the general rule; *Pyrameis Gonerilla* may almost vie with our European *P. Atalanta*; the beautiful silvery-streaked *Argyrophenga* is also only surpassed by the *Argyrophorus argenteus* of Chili; and one or two of the smaller moths are very pretty indeed.

In the following list I have followed Bates's arrangement for the Rhopalocera and Walker's for the Heterocera—

## Section RHOPALOCERA, Boisduval.

## Family 1. NYMPHALIDÆ, Westwood.

*Gen. Diurn. Lepid.*, p. 143 (1852); *Bates, Journ. Entom.*, p. 176 (1864).

## Sub-Family 1. DANAINÆ, Bates.

*Journ. Entom.* p. 220 (1861), p. 176 (1864).

## Genus HAMADRYAS, Boisduval.

*Voy. de l'Astrolabe, Ent.* p. 91 (1832).

## 1. HAMADRYAS ZOILUS.

*Papilio D. F. Zoilus, Fab., Syst. Ent.*, p. 480, n. 163 (1775); *Sp. Ins.*, p. 53, n. 229 (1781); *Man. Ins.*, p. 23, n. 265 (1787); *Ent. Syst.* III., p. 42, n. 128 (1793); *Gen. Diurn. Lepid.*, pl. XVIII\*, f. 1 (1847).

Barnard Isle, Australia (*Macgillivray*). B.M. Said to occur in New Zealand; see *Diefenbach's N. Zeal. II. App.*, p. 284, an Australian example in the collection of the British Museum bears a label with the following note, "In thick and gloomy brushes."

The *Nymphalis Nais* of Guerin is slightly different from the typical form.

## Sub-Family 2. SATYRINÆ, Bates.

*Journ. Entom.* II., p. 176 (1864).

## Genus 2. ARGYROPHENGA, Doubleday.

*Ann. & Mag. Nat. Hist. XVI.*, p. 307 (1845).

2. ARGYROPHENGA ANTIPODUM. *Tab. 8, fs. 4-7.*

*Argyrophenga antipodum, Doubleday, Ann. & Mag. Nat. Hist. XVI.*, p. 307 (1845); *Gen. Diurn. Lepid.*, pl. 63, f. 6 (1851).

New Zealand (*P. Earle*).

Type. B.M.

The introduction of ocelli on the undersurface of the secondaries in fig. 6 is probably an error, we apparently have the specimens from which all the figures were taken in the collection; and an example, answering in all other respects to figs. 4 and 6, shows no trace of these ocelli.

This species is, according to Mr. Fereday (Trans. New Zeal. Inst. IV., p. 217) rather common in some river beds, particularly the Waimakariri.

Before passing on to the next sub-family I may mention an ? *Erebia* named by Mr. Fereday as *E. phuto* but merely described as "black." I should much like to see the species and decide its natural position.

## Sub-family 3. NYMPHALINÆ, Bates.

*Journ. Entom.* II., p. 176 (1864).

## Genus 3. PYRAMEIS, Hübner.

*Verz. bek. Schmett.* p. 33 (1816).

2. PYRAMEIS GONERILLA. *Tab. 8, figs. 10, 11.*

*Papilio N. G. Gonerilla, Fab., Syst. Ent.*, p. 498, n.

\* The italics are our own.



237 (1775); *Sp. Ins.*, p. 82, n. 361 (1781); *Ent. Syst. III.*, p. 103, n. 317 (1793); *Donovan, Ins. New Holland*, pl. 25, f. 2 (1805).

*Vanessa Gonerilla*, *White*, in *Taylor's New Zealand and its inhabitants*, pl. 2, f. 1 (1855).

*Papilio Gonerilla* (sic), *Fab., Mant. Ins.*, p. 44, n. 437 (1787).

Rangitanharuru, New Zealand (*Colenso*). B.M.

The type of this beautiful species is in the Banksian cabinet in the British Museum; it is common, and the earliest butterfly at Otago (*A. Bathgate*).

#### 4. PYRAMEIS ITEA.

*Papilio N. G. Itēa*, *Fab., Syst. Ent.*, p. 498, n. 238 (1775); *Sp. Ins.*, p. 82, n. 362 (1781); *Mant. Ins.*, p. 45, n. 438 (1787); *Ent. Syst.*, p. 103, n. 318 (1793); *Donovan, Ins. New Holland*, pl. 26, f. 1 (1805); *Vanessa Itēa*, *White*, in *Taylor's New Zealand and its inhabitants*, pl. 2, fs. 2, 2 (1855).

New Zealand (*Sinclair*). B.M.

The type is in the Banksian collection.

#### 5. PYRAMEIS CARDUI, (var. *P. Kershawii*).

*Papilio Cardui*, *Linn., Faun. Suec.*, p. 276, n. 1054 (1761).

*Cynthia Cardui*, *White*, in *Taylor's New Zealand and its inhabitants*, pl. 2, f. 5 (1855).

*Cynthia Kershawii*, *McCoy, Ann. & Mag. Nat. Hist. IV.*, vol. 1, p. 76 (1868).

New Zealand, Auckland (*Bolton*). B.M.

*P. Kershawii* only differs from the typical *P. Cardui* in its dark coloration on both surfaces and in the size of the blue pupils in the ocelli of secondaries, but these are variable characters and not sufficient to distinguish the two forms; indeed our examples are separated by locality only, there being examples of *P. Kershawii* in the collection precisely like typical *P. Cardui* and vice versa; it is, however, interesting to keep this variety separate in a large collection, as one of the links in the perfect series of forms connecting *P. Cardui* and *P. Atalanta*: Mr. Fereday supposes *P. itea* to be intermediate between *P. gonerilla* and *P. cardui*; if so, a great many links must have fallen out: none of these species have the least claim to be referred to the genus *Vanessa*, the form of the secondaries alone is sufficient to suggest their distinctness from that group.

#### Family 2. LYCENIDÆ, Stephens.

*Ill. Brit. Ent. Haust. I.*, p. 74 (1827).

#### Sub-family 4. LYCENINÆ, Butler.

*Cat. Fabric. Diurn. Lepid.*, p. 158 (1869).

#### Genus 4. CHRYSOPHANUS, Hübner.

*Verz. bek. Schmett.*, p. 72 (1816).

#### 6. CHRYSOPHANUS SALUSTIUS. Tab. 8, fs. 1—3.

*Hesperia R. Salustius*, *Fab., Ent. Syst. III.*, p. 310,

n. 175 (1793); *Lycæna Edna*, *Doubleday, Dieff. N. Zeal. App.*, p. 283 (1843); *Polymommatus Edna*, *Westwood & Hewitson, Gen. Diurn. Lepid.*, pl. 76, f. 6 (1852); *White in Taylor's New Zealand and its inhabitants*, pl. 2, fs. 3, 4 (1855).

New Zealand (*Sinclair*).

B.M.

#### 7. CHRYSOPHANUS FEREDAYI.

*Chrysophanus Feredayi*, *Bates, Ent. Mo. Mag. IV.*, p. 53 (1867).

Kaipoi Bush, Canterbury (*Fereday*)—*Bates*.

Differs from *C. Salustius* in having the secondaries below clouded with brown; the difference in the colour of the palpi, mentioned by Mr. Bates, occurs also in some examples of *C. Salustius*; I doubt the distinctness of this species, I have not however seen it.

#### 8. CHRYSOPHANUS BOLDENARUM. Tab. 8, fs. 8, 9.

*Lycæna Boldenarum* *White, Proc. Ent. Soc. Ser. 3, I.*, p. 26 (1862).

This species having been but imperfectly described, I subjoin characters—

♂ Wings above brown, shot with glistening purple; a curved discal series of six orange spots bordered internally with black on each wing; also a second ill-defined submarginal series, not reaching the apices; outer margin broadly dark brown; primaries with a black spot towards end of discoidal cell and a second at end of cell, between and beyond these three or four ill-defined orange spots; secondaries with a black spot at end of cell, bordered internally with ill-defined orange; beyond it are also three or four ill-defined orange spots; body above blackish, crest grey; palpi and undersurface snow white.

Wings below altogether paler; primaries pale tawny; the margins grey; two spots within cell, one at the end and a curved discal series, black, indistinctly edged with white; a submarginal ill-defined series of greyish ocelli; secondaries pale golden brown, a broad band across the centre of the wings, two subbasal discoidal spots and a submarginal series silver grey, white-edged: expanse of wings, 10 lines.

♀ Wings above without the purple shot, excepting a submarginal macular line, between the discal and anti-marginal series of orange spots; remaining orange spots larger, more elongated and distinct, otherwise as in the male; body as in the male.

Wings below rather darker than in the male, otherwise the same: expanse of wings, 1 inch, 1 line.

New Zealand (*Colenso*).

B.M.

The figures represent the male, but the bands and spots on the undersurface of secondaries have been made altogether too dark.

Mr. Fereday thinks there may be two other species of this genus, *Trans. New Zeal. Inst. IV.*, p. 217 (1872).

## Genus 5. LYCÆNA, Fabricius.

*Illiger's Mag.* VI., p. 285 (1808).

## 9. LYCÆNA OXLEYI.

Lycæna Oxleyi, *Felder, Reise der Novara, Lep.* II., p. 280, n. 354; *pl.* 35, f. 6 (1865).  
New Zealand (Colenso).

B.M.

## Section HETEROCERA, Boisduval.

## Tribe 1. SPHINGII, Walker.

## Family 3. SPHINGIDÆ, Walker.

*Lep. Het.* VIII., p. 76 (1856).

## Genus 6. SPHINX, Linnæus.

*Syst. Nat.* 1, 2, p. 796 (1766).10. SPHINX CONVULVI (var. *S. distans*). *Tab.* 9, fig. 11.

Sphinx Convulvi, *Linnæus, Syst. Nat.* 1, 2, p. 789, n. 6 (1766); *White, in Taylor's New Zealand and its inhabitants, pl.* 1, f. 13 (1855).

Sphinx Convulvi, var.  $\gamma$ , *Walker, Lep. Het.* VIII., p. 213 (1856).

New Zealand (*Sinclair and Bolton*).

Type. B.M.

This form, if it proves to be constant, will certainly rank as a distinct species from *S. Convulvi*; it is altogether smaller, darker, less tinted with rose on the body, and has the markings on primaries more confused; the figure in Taylor's New Zealand is, like his other figures very poor, and gives but a vague idea of the species.

## Family 4. ÆGERIIDÆ, Stephens.

*Ill. Brit. Ent. Haust. fam.* 8 (1829).

## Genus 7. ÆGERIA, Fabricius.

*Illiger's Mag.* VI., p. 289 (1808).

## 11. ÆGERIA TIPULIFORMIS.

Sphinx Tipuliformis, *Linn., Faun. Suec.*, p. 289, n. 1096.  
Setia Tipuliformis, (*sic*), *Fab., Ent. Syst.* III., 1, p. 385, n. 21 (1793).

Sesia Tipuliformis, *Meigen, Syst. Besch.* II., p. 119, n. 25; *pl.* 62, f. 2.

Ægeria Tipuliformis, *Stephens, Ill. Brit. Ent. Haust.* 1, p. 142 (1829).

Trochilium Tipuliforme, *Newman, Ent. Mag.* I., p. 78.  
Sphinx Salmachus, *Linn., Syst. Nat. ed.* 10, p. 493, n. 30.

Christchurch (*Fereday*).

Bred by Mr. Fereday from currant-bushes at Christchurch, and supposed by him to have been imported with them into New Zealand (*Ent. Mo. Mag.* VI., p. 146).

## Tribe 2. BOMBYCITES, Latreille.

## Family 5. LITHOSIDÆ, Stephens.

*Ill. Brit. Ent. Haust.* II., p. 88 (1829).

## Genus 8. NYCTEMERA, Hübner.

*Verz. bek. Schmett.* p. 178 (1816).

## 12. NYCTEMERA ANNULATA.

Leptosoma annulatum, *Boisduval, Voy. de l'Astrolabe, pl.* 5, f. 9 (1853); *Doubleday, Dieff. N. Zeal.* II., App., p. 284, n. 115 (1843).

Nyctemera Doubledayi, *Walker, Lep. Het.* II., p. 392 n. 2 (1854); *White in Taylor's New Zealand and its inhabitants, pl.* 1, f. 12 (1855).

New Zealand (*Colenso, Sinclair, Parry & Ross*).

Type. B.M.

The generic name *Leptosoma* being already preoccupied in *Coleoptera* (1819); *Crustacea* (1826); *Pisces* (1827); and the name *Leptosomus* having also been used in *Aves* (1816) and *Coleoptera* (1826); I think we have sufficient ground for rejecting it in favour of *Nyctemera* (Hübner) Walker; whether all the species of *Nyctemera* are congeneric or not, is a question that can only be settled by a careful examination of all the structural characters, but I am inclined to suspect that they are not.

"The larvæ are black hairy caterpillars, which do not seem to be at all particular as to what they eat, for they seem to devour indiscriminately the grass and other small herbage." "There are probably two broods a year, for the moths from the early brood come out about the end of November and beginning of December." (A. Bathgate, *Trans. Proc. N. Zeal. Inst.* III., p. 140 (1871).

The larvæ of *N. annulata* are according to Mr. Fereday (*Trans. N. Zeal. Inst.* 4, p. 218) common on a species of ragwort.

## Family 6. DREPANULIDÆ, Walker.

*Lep. Het.* V., p. 1158, *fam.* 7 (1855).

## Genus 9. MOROVA, Walker.

*Lep. Het. Suppl.* II., p. 523 (1865).

## 13. MOROVA SUBFASCIATA.

Morova subfasciata, *Walker, Lep. Het. Suppl.* II., p. 523 (1865).

Auckland (*Oxley*).

The type is probably in the collection of the British Museum.

## Family 7. HEPIALIDÆ, Stephens.

*Ill. Brit. Ent. Haust.* II., p. 3 (1829).

## Genus 10. CHARAGIA, Walker.

*Lep. Het.* VII., p. 1569, *gen.* 8 (1856).

## 14. CHARAGIA VIRESCENS.

Hepialus virens, *Doubleday, Dieff. N. Zeal.* II. App.,

p. 284, n. 114 (1843); *White, in New Zealand and its inhabitants*, pl. 1, f. 6 (1855).

*Charagia virescens*, *Walker, Lep. Het. VII.*, p. 1569, n. 1 (1856).

New Zealand (*Earl*). B.M.

The larva of this species is well known to be attacked by *Sphaeria Robertsii* of Hooker, which converts it entirely into a woody substance; the type of this species was taken at Waitemata by Dr. Dieffenbach.

#### 15. CHARAGIA RUBROVIRIDANS.

*Charagia rubroviridans*, *White, in Taylor's New Zealand and its inhabitants*, pl. 1, f. 1 (1855); *Walker, Lep. Het. VII.*, p. 1570, n. 2 (1856).

New Zealand (*Sinclair*). Type. B.M.

A larger and more deeply coloured species than *C. virescens*; we have both sexes in the collection, they are quite alike in colouring; in the *Trans. Ent. Soc. New South Wales*, vol. II., pp. 28, 29 Mr. A. W. Scott makes this species the female of *C. virescens*, and credits Walker with the species; he appears, therefore, to be wrong in both of his conclusions.

Genus 11. LETO, Hübner.  
*Verz. bck. Schmett.*, p. 197 (1816).

#### 16. LETO INGENS.

*Charagia ingens*, *Walker, Lep. Het. Suppl. II.*, p. 596 (1865).

New Zealand (*from Mr. Children*). Type. B.M.

This species is certainly referable to the Genus *Leto*, it differs entirely from *Charagia* in the neurulation of secondaries; it is probably the largest of all the New Zealand moths.

This species is rightly omitted by Mr. Scott in his paper on the genus *Charagia*.

Genus 12. HEPIALUS, Fabricius.  
*Gen. Ins.*, p. 162 (1776).

#### 17. HEPIALUS DESPECTUS.

*Hepialus despectus*, *Walker, Lep. Het. Suppl. II.*, p. 594 (1865).

Auckland (*Oxley*). Type. B.M.

#### 18. HEPIALUS CHARACTERIFER.

*Hepialus characterifer*, *Walker, Lep. Het. Suppl. II.*, p. 594 (1865).

Auckland (*Oxley*). Type. B.M.

Genus 13. PORINA, Walker.  
*Lep. Het. VII.*, p. 1572, gen. 11 (1856).

#### 19. PORINA MAIRI.

*Porina Mairi*, *Buller, Trans. N. Zeal. Inst. V.*, p. 279, pl. xvii. (1873).

Ruahine ranges (*Buller*).

One dead specimen of this handsome moth was found by Mr. Buller on a tree-stump.

#### 20. PORINA SIGNATA. Tab. 9, fig. 8.

*Elhamma signata*, *Walker, Lep. Het. VII.*, p. 1563, n. 3 (1856).

*Porina Novæ Zealandiæ*, *Walker, Lep. Het. VII.*, p. 1573, n. 1 (1856).

*Pielus variolaris*, *Guénée, Ent. Mo. Mag. V.*, p. 1 (1868).

*Hepialus* —, *White, in Taylor's New Zealand and its inhabitants*, pl. 1, fs. 4, 5 (1855).

New Zealand (*Sinclair, Colenso, Bolton, Churton, Parry, Ross*). Type. B.M.

#### 21. PORINA CERVINATA.

*Elhamma cervinata*, *Walker, Lep. Het. Suppl. II.*, p. 595 (1865).

Auckland (*Oxley*). Type. B.M.

Allied to *P. signata*.

#### 22. PORINA UMBRACULATA.

*Pielus umbraculatus*, *Guénée, Ent. Mo. Mag. V.*, p. 1 (1868). Canterbury (*Fereday*).

The description of this species leads me to suspect that it is one of the many varieties of *P. signata*, Walker, (*P. variolaris*, Guénée), we have examples which agree well with it: M. Guénée is quite wrong in referring these species to Walker's genus *Pielus*, the species of that group being not only all large insects, but having the costal and subcostal nervures of secondaries clearly separated throughout their entire length, and the antennæ proportionately longer.

#### 23. PORINA VEXATA.

*Porina vexata*, *Walker, Lep. Het. Suppl. II.*, p. 597 (1865).

Auckland, New Zealand (*Oxley*). Type. B.M.

Allied to *P. signata*, but smaller, darker, and with the silvery spots obsolescent, those in discoidal cell only being distinct.

The species of *Porina* have the same habits as our own "swifts" in England.—See Fereday in *Trans. N. Zeal. Inst. V.*, p. 290 (1873).

Genus 14. OXYCANUS, Walker.  
*Lep. Het. VII.*, p. 1573, gen. 12 (1856).

#### 24. OXYCANUS IMPLETUS.

*Oxycanus impletus*, *Walker, Lep. Het. Suppl. II.*, p. 598 (1865).

Auckland (*Oxley*).

I have not seen the type of this species.

## Tribe 3. NOCTUITES, Walker.

## Family 8. BRYOPHILIDÆ, Guénée.

*Gen. Lép. Noct. I.*, p. 21 (1852).

## Genus 15. BRYOPHILA, Treitschke.

*Eur. Schmelt. V.*, p. 57 (1825).

## 25. BRYOPHILA TEMPERATA.

*Bryophila temperata*, Walker, *Lep. Het. XV.*, p. 1648 (1858).

New Zealand (Churton).

Type. B.M.

## Genus 16. DECLANA, Walker.

*Lep. Het. XV.*, p. 1649 (1858).

## 26. DECLANA FLOCCOSA.

*Declana floccosa*, Walker, *Lep. Het. XV.*, p. 1649 (1858).  
New Zealand (Bolton).

Type. B.M.

## Family 9. BOMBYCIDÆ, Guénée.

*Gen. Lép. Noct. I.*, p. 33 (1852).

## Genus 17. DETUNDA, Walker.

*Lep. Het. Suppl. II.*, p. 618 (1865).

## 27. DETUNDA ATRONIVEA.

*Detunda atronivea*, Walker, *Lep. Het. Suppl. II.*, p. 619 (1865).

New Zealand (Parry).

I have not seen the type.

## Family 10. LEUCANIDÆ, Guénée.

*Gen. Lép. Noct. I.*, p. 65 (1852).

## Genus 18. LEUCANIA, Hübner.

*Verz. bck. Schmelt.*, p. 241 (1816).

28. LEUCANIA EXTRANEA. *Tab. 9, fig. 2.*

*Leucania extranea*, Guénée, *Noct. I.*, p. 77, n. 104 (1852).  
New Zealand (Sinclair, Colenso, Bolton).

B.M.

29. LEUCANIA PROPRIA. *Tab. 9, fig. 4.*

*Leucania propria*, Walker, *Lep. Het. IX.*, p. 111, n. 80 (1856); *Guénée, Ent. Mo. Mag. V.*, p. 2 (1868).

New Zealand (Earl).

Type. B.M.

30. LEUCANIA UNICA. *Tab. 9, fig. 9.*

*Leucania unica*, Walker, *Lep. Het. IX.*, p. 112, n. 81 (1856).

New Zealand (Earl).

Type. B.M.

## 31. LEUCANIA SEMIVITTATA.

*Leucania semivittata*, Walker, *Lep. Het. Suppl. II.*, p. 628 (1865).

Auckland (Oxley).

Type. B.M.

## Genus 19. NONAGRIA, Hübner.

*Verz. bck. Schmelt.*, p. 241 (1816).

## 32. NONAGRIA JUNCICOLOR.

*Nonagria juncicolor*, Guénée, *Ent. Mo. Mag. V.*, p. 2 (1868).  
Canterbury (Fereday).

Mr. Fereday will be able to judge from the plate, whether or not this is the *Leucania unica* of Walker (See note Ent. Mo. Mag. V., p. 3).

## Genus 20. IPANA, Walker.

*Lep. Het. XV.*, p. 1661 (1858).

## 33. IPANA LEPTOMERA.

*Ipana leptomera*, Walker, *Lep. Het. XV.*, p. 1662, n. 1 (1858).

New Zealand (Bolton).

Type. B.M.

Very like a *Leucania* excepting that the body is unusually long.

## Family 11. GLOTTULIDÆ, Guénée.

*Gen. Lép. Noct. I.*, p. 112 (1852).

## Genus 21. POLITEIA, Walker.

*Lep. Het. Suppl. II.*, p. 642 (1865).

## 34. POLITEIA JUNCTILINEA.

*Politeia junctilinea*, Walker, *Lep. Het. Suppl. II.*, p. 643 (1865).

Auckland (Oxley).

I have not seen the type.

## Family 12. APAMIDÆ, Guénée.

*Gen. Lép. Noct. I.*, p. 119 (1852).

## Sub-family EPISEMINÆ, Butler.

(*Episemides*, Guénée, *Noct. I.*, p. 168 (1852); *Episemidæ*, Walker.)

## Genus 22. HELIOPHOBUS, Boisduval.

*Ind. p.* 69 (1829).

35. HELIOPHOBUS DISJUNGENS. *Tab. 9, fig. 1.*

*Heliophobus disjungens*, Walker, *Lep. Het. XV.*, p. 1681 (1858).

New Zealand (Earl).

Type. B.M.

## Genus 23. ALYSIA, Guénée.

*Ent. Mo. Mag. V.*, p. 3, *fam.* 3 (1868).

## 36. ALYSIA SPECIFICA.

*Alysia specifica*, Guénée, *Ent. Mo. Mag. V.*, p. 3 (1868).

*Alysia specificata* (sic), Fereday, *Trans. N. Zeal. Inst. IV.*, p. 218 (1872).

Canterbury (Fereday).

"Bred from larvæ taken out of the heart of 'Wild



Spaniard' (*Aciphylla squarrosa*) on which it was feeding.  
Fereday, Trans. N. Zeal. Inst. IV., p. 218 (1872).

Sub-family 6. APAMINÆ, Butler.  
Apamides, *Guén.* Noct. I., p. 178 (1852).

Genus 24. MAMESTRA, Hübner.  
*Verz. bek. Schmett.*, p. 214 (1816).

37. MAMESTRA COMMA. *Tab. 9, fig. 6.*

Mamestra comma, *Walker, Lep. Het. IX.*, p. 239, n. 40 (1856).

Graphiphora implexa, *Walker, Lep. Het. X.*, p. 405, n. 42 (1856).

New Zealand (*Churton, Colenso, Smith*). Types. B.M.

M. Guénée believing that he has rightly identified this species, and erroneously supposing that the same specific name cannot be used twice in one family, has proposed for it the name *Nitocris bicomma* (*Ent. Mo. Mag. V.*, p. 4); but first it remains to be proved that his identification is correct, and then the generic name only, according to general usage, can be altered.

Family 13. NOCTUIDÆ, Stephens.  
*Ill. Brit. Ent. Haust. II.*, p. 100 (1829).

Genus 25. NITOCRIS, Guénée.  
*Ent. Mo. Mag. V.*, p. 4, *Fam. V.* (1868).

38. NITOCRIS BICOMMA (? *Mamestra comma* Walker).

Nitocris bicomma, *Guénée, Ent. Mo. Mag. V.*, p. 4 (1868).  
Canterbury (*Fereday*).

It will be seen, by reference to the plate, whether or not this is Mr. Walker's species; if so, that species will be referred to the present family under the name of *Nitocris comma*.

Genus 26. AGROTIS, Ochsenheimer.  
*Syst. Gloss. Schmett. von. Eur. IV.*, p. 66 (1816).

39. AGROTIS SUFFUSA.

Noctua suffusa, *Denis, Wien. Verz.*, p. 80, n. 4 (1775).  
Phalena Noctua suffusa, *Gmelin, ed. Syst. Nat. I.*, 5, p. 2541, n. 1028 (1788-93).

Peridroma suffusa, *Hübner, Verz. bek. Schmett.*, p. 227, n. 2275 (1816).

Agrotis suffusa, *Treitschke, Schmett. Eur. V.*, 1, p. 152, n. 15 (1825).

Bombyx spinula, *Esp., Schmett. III.*, pl. 63, fs. 6, 7 (1782).  
New Zealand (*Sinclair, Bolton, Earle*). B.M.

40. AGROTIS MUNDA.

Agrotis munda, *Walker, Lep. Het. X.*, p. 348, n. 99 (1856).  
New Zealand (*Churton*). Type. B.M.

41. AGROTIS NULLIFERA. *Tab. 9, fig. 5.*

Agrotis nullifera, *Walker, Lep. Het. XI.*, p. 742 (1857).  
New Zealand (*Earle*). Type. B.M.

42. AGROTIS ? MODERATA.

Agrotis ? moderata, *Walker, Lep. Het. Suppl. II.*, p. 705 (1865).

Auckland (*Ozley*). Type. B.M.

43. AGROTIS CÆRULEA.

Agrotis (Spælotis) cærulea, *Guénée, Ent. Mo. Mag. V.*, p. 38 (1868).

Canterbury (*Fereday*).

44. AGROTIS ADMIRATIONIS.

Agrotis admirationis, *Guénée, Ent. Mo. Mag. V.*, p. 38 (1868).

Canterbury (*Fereday*).

45. AGROTIS CEROPACHOIDES.

Agrotis ceropachoides, *Guénée, Ent. Mo. Mag. V.*, p. 39 (1868).

Canterbury (*Fereday*).

Family 14. ORTHOSIÆ, Guénée.

*Ann. Soc. Ent. France*, VI., p. 224.

Genus 27. ORTHOSIA, Ochsenheimer.  
*Syst. Gloss. Schmett. Eur. IV.*, p. 79 (1816).

46. ORTHOSIA INFENSA.

Orthosia infensa, *Walker, Lep. Het. XI.*, p. 748 (1857).  
New Zealand (*Earle*). B.M.

47. ORTHOSIA COMMUNICATA.

Orthosia communicata, *Walker, Lep. Het. Suppl. III.*, p. 716 (1865).

Auckland (*Ozley*). Type. B.M.

Genus 28. TÆNIOCAMPA, Guénée.

*Ann. Soc. Ent. France* VIII., p. 477.

48. TÆNIOCAMPA IMMUNIS.

Tæniocampa immunis, *Walker, Lep. Het. X.*, p. 430, n. 19 (1856).

New Zealand (*Colenso*). B.M.

Genus 29. EUMICHTIS, Hübner.

*Verz. bek. Schmett.*, p. 211 (1816).

49. EUMICHTIS SISTENS.

Eumichtis sistens, *Guénée, Ent. Mo. Mag. V.*, p. 39 (1868).  
Canterbury (*Fereday*).

## Family 15. HADENIDÆ, Guénée.

Gen. Lép. Noct. II., p. 14 (1852).

## Genus 30. DASYPOLIA, Guénée.

Gen. Lép. Noct. II., p. 44 (1852).

## 50. DASYPOLIA? DOTATA.

Dasyptolia? dotata, Walker, Lep. Het. XI., p. 522, n. 2 (1857).

New Zealand (Colenso).

B.M.

## Genus 31. EUPLEXIA, Stephens.

Ill. Brit. Ins. Haust. gen. 109 (1829).

## 51. EUPLEXIA INSIGNIS.

Euplexia insignis, Walker, Lep. Het. Suppl. III., p. 724 (1865).

Auckland (Oxley).

Type. B.M.

Very close to *E. indocilis*, but perhaps distinct.

## Genus 32. HADENA, Guénée.

Ann. Soc. Ent. France VII., p. 213.

## 52. HADENA PICTULA.

Dianthecia pictula, White, in Taylor's New Zealand and its inhabitants, (Te Ika a Maui), pl. 1, f. 3 (1855).

Hadena pictula, Walk., Lep. Het. XI., p. 601, n. 99 (1857).

New Zealand (Dohrn and Bolton).

B.M.

The figure in Mr. Taylor's work is quite useless.

## 53. HADENA MUTANS.

Hadena mutans, Wlk., Lep. Het. XI., p. 602, n. 100 (1857).

New Zealand (Bolton, Colenso, Sinclair). Type. B.M.

## 54. HADENA LIGNIFUSCA.

Hadena lignifusca, Walker, Lep. Het. XI., p. 603, n. 101 (1857).

New Zealand (Bolton).

Type. B.M.

## 55. HADENA LIGNANA. Tab. 9, fig. 7.

Hadena lignana, Walker, Lep. Het. XI., p. 758 (1857).

New Zealand (Earl).

Type. B.M.

## 56. HADENA PLUSIATA.

Hadena plusiata, Walker, Lep. Het. Suppl. III., p. 742 (1865).

Auckland (Oxley).

Type. B.M.

## 57. HADENA NERVATA.

Hadena nervata, Guénée, Ent. Mo. Mag. V., p. 40 (1868).  
Canterbury (Fereday).

## Genus 33. ERANA, Walker.

Lep. Het. XI., p. 605, gen. 24 (1857).

## 58. ERANA GRAMINOSA.

Erana graminosa, Wlk., Lep. Het. XI., p. 605, n. 1 (1857).

var. Erana vicens, Wlk., Lep. Het. Suppl. 3 p. 743 (1865).

New Zealand (Churton), Auckland (Oxley). Types. B.M.

## 59. ERANA PLENA.

Erana plena, Wlk., Lep. Het. Suppl. III., p. 744 (1865).

Auckland (Oxley).

Type. B.M.

## Family 16. XYLINIDÆ, Guénée.

Gen. Lép. Noct. II., p. 107 (1852).

## Genus 34. AUCHMIS, Hübner.

Verz. bek. Schmett. p. 243 (1816).

## 60. AUCHMIS COMPOSITA. Tab. 10, fig. 12.

Cloanthia composita, Guénée, Gen. Lép. Noct. II., p. 114, n. 832 (1852).

Auchmis composita, Walker, Lep. Het. XI., p. 616, n. 4 (1857).

New Zealand (Colenso, Sinclair, Bolton, Churton). B.M.

"Frequently seen on the wing in the daytime, flying briskly from flower to flower, and feeding upon the nectar, which it extracts with its long proboscis. The larvæ are . . . of a variety of colours, and striped longitudinally with numerous thread-like lines. They have sixteen feet, and feed principally on grasses and standing corn—especially rye-grass and oats."—Fereday Trans. N. Zeal. Inst. V., p. 291 (1873).

## Genus 35. XYLOCAMPA, Guénée.

Ann. Soc. Ent. France VI., p. 227.

## 61. XYLOCAMPA CUCULLINA.

Xylocampa cucullina, Guénée, Ent. Mo. Mag. V., p. 40 (1868).

Canterbury (Fereday).

## Genus 36. XYLINA, Treitschke.

Eur. Schmett. V., p. 3 (1826).

## 62. XYLINA USTISTRIGA.

Xylina ustistriga, Walker, Lep. Het. XI., p. 630, n. 19 (1857).

New Zealand (Colenso).

Type. B.M.

## 63. XYLINA LIGNISECTA.

Xylina lignisecta, Walker, Lep. Het. XI., p. 631, n. 20 (1857).

New Zealand.

Type. B.M.

## 64. XYLINA SPURCATA.

Xylina spurcata, Wlk., Lep. Het. XI., p. 631, n. 21 (1857).

New Zealand (Bolton).

Type. B.M.

## 65. XYLINA ? DECEPTURA.

*Xylina ? deceptura*, Walker, *Lep. Hct.* XV., p. 1737 (1857).  
New Zealand (Churton). Type. B.M.

## 66. XYLINA PROVIDA.

*Xylina provida*, Walker, *Lep. Hct.* XV., p. 1737 (1858).  
New Zealand (Bolton). Type. B.M.

## 67. XYLINA INCEPTURA (? genus XYLOCAMPA).

*Xylina inceptura*, Walker, *Lep. Hct.* XV., p. 1736 (1858).  
New Zealand (Churton). Type. B.M.  
See Guénée's note on this species, *Ent. Mo. Mag.* V., p. 40 (1868).

## 68. XYLINA STIPATA.

*Xylina stipata*, Wlk., *Lep. Hct. Suppl.* III., p. 753 (1865).  
Auckland (Osley). Type. B.M.

## 69. XYLINA TURBIDA.

*Xylina turbida*, Wlk., *Lep. Hct. Suppl.* III., p. 754 (1865).  
Auckland (Osley). Type. B.M.

## 70. XYLINA VEXATA.

*Xylina vexata*, Wlk., *Lep. Hct. Suppl.* III., p. 755 (1865).  
Auckland (Osley). Type. B.M.

## 71. XYLINA DEFIGURATA.

*Xylina defigurata*, Wlk., *Lep. Hct. Suppl.* III., p. 756 (1865).  
Auckland (Osley). Type. B.M.

## 72. XYLINA ATRISTRIGA.

*Xylina atristriga*, Walker, *Lep. Hct. Suppl.* III., p. 756 (1865).  
Auckland (Osley). Type. B.M.

## 73. XYLINA CANESCENS.

*Xylina canescens*, Walker, *Lep. Hct. Suppl.* III., p. 757 (1865).  
Auckland (Osley). Type. B.M.

## Family 17. HELIOTHIDÆ, Guénée.

*Gen. Léop. Noct.* II., p. 166 (1852).

## Genus 37. HELIOTHIS, Ochsenheimer.

*Eur. Schmett.* IV., p. 91 (1816).

## 74. HELIOTHIS PELTIGERA.

*Noctua peltigera*, Denis, *Wiën. Verz.* p. 89, n. 2 (1775).  
*Melicleptria peltigera*, Hübn., *Verz. bek. Schmett.* p. 262, n. 2576 (1816).  
*Heliothis peltigera*, Treitschke, *Schmett. Eur.* V., p. 227, n. 5 (1825).  
*Heliothis peltigera*, Meigen, *Syst. Besch.* III., p. 234, pl. 210, f. 14 (1830).

*Noctua Florentina*, Esper, *Eur. Schmett.* IV., pl. 135, f. 2 (1782).

*Phalæna-Noctua Alpheia*, Cramer, *Pap. Exot.* III., p. 99, pl. 250, f. F. (1782).

*Melicleptria Alpheia*, Hübn., *Verz. bek. Schmett.* p. 262, n. 2577 (1816).

*Noctua scutigera*, Borkhausen, *Eur. Schmett.* IV., p. 93, n. 37 (1792).

*Noctua Barbara*, Fab., *Ent. Syst.* III., 2, p. 111, n. 334 (1793).

*Noctua straminea*, Donovan, *Brit. Ins.* II., pl. 61 (1793).  
New Zealand (Sinclair). B.M.

## 75. HELIOTHIS ARMIGERA.

*Noctua armigera*, Hübn., *Samml. Eur. Schmett. Noct.*, pl. 79, f. 370 (1805-24).

*Heliothis armigera*, Treitschke, *Schmett. Eur.* III., p. 230, n. 6 (1825).

*Heliothis armigera*, Meigen, *Syst. Besch.* III., p. 234, pl. 120, f. 15 (1830).

New Zealand (Sinclair, Colenso, Bolton, Churton). B.M.  
See Fereday's note on this species *Trans. N. Zeal. Inst.* V., p. 291 (1873).

## 76. HELIOTHIS CONFERTA.

*Heliothis conferta*, Walker, *Lep. Hct.* XI., p. 690, n. 21 (1857).

New Zealand (Sinclair, Bolton). Type. B.M.

## Family 18. ERIOPIDÆ, Guénée.

*Gen. Léop. Noct.* II., p. 288 (1852).

## Genus 38. COSMODES, Guénée.

*Gen. Léop. Noct.* II., p. 289 (1852).

## 77. COSMODES ELEGANS.

*Phalæna elegans*, Donovan, *Ins. New Holl.*, pl. 36, fig. 5 (1805).

*Plusia ? elegans*, Boisduval, *Voy. de l'ASTROLABE*, I., *Lép.* p. 242 (1832-35).

*Cosmodes elegans*, Guénée, *Sp. Gen. Léop. Noct.* II., p. 290, n. 1092 (1852).

New Zealand (Sinclair, Colenso, Bolton). B.M.

## Family 19. PLUSIÆ, Guénée.

*Gen. Léop. Noct.* II., p. 319 (1852).

## Genus 39. PLUSIA, Ochsenheimer.

*Eur. Schmett.* IV., p. 89 (1816).

## 78. PLUSIA ERIOSOMA. Tab. 10, figs. 1, 2.

*Plusia eriosoma*, Doubleday, *Dieff. N. Zeal.*, App., p. 285 (1843).

New Zealand (Bolton, Colenso, Sinclair, Parry, Ross).

Type. B.M.

The sexes are represented on our plate.

## Family 20. AMPHIPYRIDÆ, Guénée.

Gen. Lép. Noct. II., p. 408 (1852).

## Genus 40. BITYLA, Walker.

Lep. Het. Suppl. III., p. 869 (1865).

## 79. BITYLA THORACICA.

Bityla thoracica, Walker, Lep. Het. Suppl. III., p. 869 (1865).

New Zealand (Colenso, Bolton).

Type. B.M.

## Family 21. OMMATOPHORIDÆ, Guénée.

Gen. Lép. Noct. III., p. 169 (1852).

## Genus 41. DASYPODIA, Guénée.

Gen. Lép. Noct. III., p. 174 (1852).

## 80. DASYPODIA SELENOPHORA.

Dasypodia selenophora, Guénée, Sp. Gen. Lép. Noct. III., p. 175, n. 1566 (1852).

Erebus n. sp. White, in Taylor's New Zealand and its Inhabitants, pl. 1, fs. 2, 2 (1855).

New Zealand (Bolton, Sinclair).

B.M.

## Tribe 4. PYRALITES, Guénée.

## Family 22. HYPENIDÆ, Guénée.

Gen. Lép. Delt. et Pyral., p. 17 (1854).

## Genus 42. RHAPSA, Walker.

Lep. Het. Suppl. IV., p. 1149 (1865).

## 81. RHAPSA SCOTOSIALIS.

Rhapsa scotosialis, Walker, Lep. Het. Suppl. IV., p. 1150 (1865).

Auckland (Bolton, Oxley).

Type. B.M.

## Family 23. ASOPIDÆ, Guénée.

Gen. Lép. Delt. et Pyral., p. 186 (1854).

## Genus 43. HYMENIA, Hübner.

Verz. bck. Schmett., p. 360 (1816).

## 82. HYMENIA ANGUSTALIS.

Phalena angustalis, Fab., Mant. Ins., p. 222, n. 309 (1787).  
Phalena recurvalis, Fab., Ent. Syst. III. 2, p. 237, n. 407 (1793).

Spoladea recurvalis, Guénée, Sp. Gen. Lép. Delt. et Pyral., p. 225, n. 190 (1854).

Hymenia recurvalis, Wlk., Lep. Het. XVIII., p. 396, n. 2 (1859).

New Zealand (Sinclair); Auckland (Bolton).

B.M.

I can discover no reason for altering the original name of this species, I have therefore retained it.

## Genus 44. DARABA, Walker.

## 83. DARABA CORDALIS, pl. X., fig. 22.

Margaritia ? cordalis, Doubleday, Dieff. N. Zeal. App., p. 238, n. 128 (1843).

Scopula ? cordalis, Walker, Lep. Het. XVIII., p. 794, n. 47 (1859).

Daraba extensalis, Walker, Lep. Het. Suppl. 4, p. 1311 (1865).

Auckland; New Zealand (Sinclair).

Type. B.M.

## Family 24. STENIADÆ, Guénée.

Gen. Lép. Delt. et Pyral., p. 232 (1854).

## Genus 45. DIASEMIA, Stephens.

Ill. Brit. Ins. Haust. IV., p. 37.

## 84. DIASEMIA GRAMMALIS, pl. X., fig. 23.

Diasemia grammalis, Doubleday, Dieff. N. Zeal. App., p. 287, n. 124 (1843).

New Zealand (Sinclair).

Type. B.M.

## Genus 46. ISCHNURGES, Lederer.

Wien. Ent. Monatshr. VII., p. 418; pl. 3, fig. 14 (1863).

## 85. ISCHNURGES ILLUSTRALIS.

Ischnurges illustralis, Lederer, Wien. Ent. Mon. VII., pl. 15, f. 12 (1863).

New Zealand.

## Family 25. BOTYDÆ, Guénée.

Gen. Lép. Delt. et Pyral., p. 315 (1854).

## Genus 47. SCOPULA, Schrank.

Fauna Boica II., 2, p. 162 (1802).

## 86. SCOPULA ? FLAVIDALIS.

Margaritia flavidalis, Doubleday, Dieff. N. Zeal. App., p. 287, n. 125 (1843).

Scopula ? flavidalis, Walker, Lep. Het. XVIII., p. 795, n. 48 (1859).

New Zealand (Sinclair).

Type. B.M.

## 87. SCOPULA QUADRALIS.

Margaritia quadralis, Doubleday, Dieff. N. Zeal. App., p. 288, n. 126 (1843).

Scopula quadralis, Walker, Lep. Het. XVIII., p. 796, n. 49 (1859).

New Zealand (Sinclair, Bolton).

Type. B.M.

## 88. SCOPULA ? DIPSAALIS.

Scopula ? dipsalis, Walker, Lep. Het. XVIII., p. 796, n. 50 (1859).

New Zealand (Sinclair).

Type. B.M.



## 89. SCOPULA ? HYBREASALIS.

Scopula ? Hybreasalis, *Walker, Lep. Hct. XVIII.*, p. 797  
n. 51 (1859).  
New Zealand (*Parry*). Type. B.M.

## 90. SCOPULA ? PARONALIS.

Scopula ? Paronalis, *Walker, Lep. Hct. XVIII.*, p. 797,  
n. 52 (1859).  
New Zealand (*Colenso, Parry*). Type. B.M.

## 91. SCOPULA ? DAICLESALIS.

Scopula ? Daiclesalis, *Walker, Lep. Hct. XIX.*, p. 1017  
(1859).  
New Zealand (*Churton*). Type. B.M.

## Genus 48. MECYNA, Guénée.

*Gen. Léop. Delt. et Pyral.*, p. 406 (1854).

## 92. MECYNA ORNITHOPTERALIS.

*Mecyna ornithopteraleis*, *Guénée, Sp. Gen. Léop. Delt. et*  
*Pyral.*, p. 411, n. 535 (1854).  
New Zealand (*Sinclair*). B.M.

## Family 26. SCOPARIDÆ, Guénée.

*Gen. Léop. Delt. et Pyral.*, p. 412 (1854).

## Genus 49. SCOPARIA, Haworth.

*Lep. Brit.*, p. 498 (1812).

## 93. SCOPARIA DIPHThERALIS.

*Scoparia diphtheralis*, *Walker, Lep. Hct. Suppl. IV.*, p.  
1501 (1865).  
Auckland (*Oxley*). Type. B.M.  
This is a variable species according to Knaggs, *Ent. Mo.*  
*Mag. IV.*, p. 81.

## 94. SCOPARIA MINUSCULALIS.

*Scoparia minusculalis*, *Walker, Lep. Hct. Suppl. IV.*, p.  
1503 (1865).  
New Zealand (*Colenso*). Type. B.M.

## 95. SCOPARIA LINEALIS.

*Scoparia linealis*, *Walker, Lep. Hct. Suppl. IV.*, p. 1503  
(1865).  
Auckland (*Oxley*). Type. B.M.

## 96. SCOPARIA MINUALIS.

*Scoparia minualis*, *Walker, Lep. Hct. Suppl. IV.*, p. 1504  
(1865).  
New Zealand (*Bolton*). Type. B.M.

## 97. SCOPARIA FEREDAYI.

*Scoparia feredayi*, *Knaggs, Ent. Mo. Mag. IV.*, p. 80  
(1867).  
New Zealand (*Fereday*).

## 98. SCOPARIA RAKAIENSIS.

*Scoparia rakaiensis*, *Knaggs, Ent. Mo. Mag. IV.*, p. 80  
(1867).  
New Zealand (*Fereday*).

## 99. SCOPARIA EJUNCIDA.

*Scoparia ejuncida*, *Knaggs, Ent. Mo. Mag. IV.*, p. 81  
(1867).  
New Zealand (*Fereday*).

## 100. SCOPARIA EXILIS.

*Scoparia exilis*, *Knaggs, Ent. Mo. Mag. IV.*, p. 81 (1867).  
New Zealand (*Fereday*).

## Tribe 5. GEOMETRITES, Newman.

## Family 27. ENNOMIDÆ, Guénée.

*Gen. Léop. Phal. I.*, p. 64 (1857).

## Genus 50. SELENIA, Hübner.

*Verz. bek. Schmett.*, p. 292 (1816).

101. SELENIA GALLARIA. *Tab. 10, figs. 6, 7.*

*Selenia gallaria*, *Walker, Lep. Hct. XX.*, p. 185, n. 6  
(1860).  
New Zealand (*Eartl*). Type. B.M.

## Genus 51. POLYGONIA, Guénée.

*Ent. Mo. Mag. V.*, p. 41, *Fam. II.* (1868).

## 102. POLYGONIA FORTINATA.

*Polygonia fortinata*, *Guénée, Ent. Mo. Mag. V.*, p. 41 (1868).  
Canterbury (*Fereday*).

## Genus 52. ANGERONA, Duponchel.

*Hist. Nat. Léop. IV.*, p. 104 (1829).

## 103. ANGERONA MENANARIA.

*Angerona menanaria*, *Walker, Lep. Hct. XXVI.*, p. 1500  
(1862).  
New Zealand (*Churton*). Type. B.M.  
A very peculiar, indistinct looking, species.

## Genus 53. ENDROPIA, Guénée.

*Gen. Léop. Phal. I.*, p. 122 (1857).

104. ENDROPIA MIXTARIA. *Tab. 10, fig. 5.*

*Endropia mixtaria*, *Wlk., Lep. Hct. XXVI.*, p. 1506 (1862).  
New Zealand. Type. B.M.  
Mr. Walker appears not to have known the locality of  
this species.

## Genus 54. LYRCEA, Walker.

*Lep. Het.* XX, p. 259, (1860).

## 105. LYRCEA ALECTORIA.

Lyrcæa Alectoria, *Wlk.*, *Lep. Het.* XX, p. 259 (1860).New Zealand (*Bolton*). Type. B.M.

## Genus 55. ENNOMOS, Treitschke.

*Eur. Schmett.* V, 2, p. 427 (1825).

## 106. ENNOMOS USTARIA.

Ennomos ustaria, *Wlk.*, *Lep. Het.* XXVI, p. 1519 (1862).Auckland (*Ozley*). Type. B.M.

## Family 28. AMPHIDASYDÆ, Guénée.

*Gen. Léop. Phal.* I, p. 190 (1857).

## Genus 56. ZERMIZINGA, Walker.

*Lep. Het.* XXVI, p. 1530 (1862).

## 107. ZERMIZINGA INDOCILISARIA.

Zermizinga indocilisaria, *Walker*, *Lep. Het.* XXVI, p.

1530 (1862).

New Zealand (*Colenso*). Type. B.M.

## Genus 57. ISCHALIS, Walker.

*Lep. Het.* XXVI, p. 1749 (1862).

## 108. ISCHALIS THERMOCHROMATA.

Ischalis thermochromata, *Walker*, *Lep. Het.* XXVI, p.

1750 (1862).

New Zealand (*Parry*). Type. B.M.

## Genus 58. SESTRA, Walker.

*Lep. Het.* XXVI, p. 1750 (1862).

## 109. SESTRA FUSIPLAGIATA.

Sestra fusiplagiata, *Walker*, *Lep. Het.* XXVI, p. 1750

(1862).

New Zealand (*Bolton*). Type. B.M.

## Family 29. BOARMIDÆ, Guénée.

*Gen. Léop. Phal.* I, p. 213 (1857).

## Genus 59. BOARMIA, Treitschke.

*Eur. Schmett.* V, 2, p. 433 (1825).

## 110. BOARMIA DEJECTARIA.

Boarmia dejectaria, *Walker*, *Lep. Het.* XXI, p. 394. n.

126 (1860).

Boarmia exprompta, *Walker*, *Lep. Het.* XXI, p. 395,

n. 128 (1860).

New Zealand (*Parry*, *Sinclair*). Types. B.M.111. BOARMIA ATTRACTA. *Tab.* 10, *fig.* 9.Boarmia attracta, *Walker*, *Lep. Het.* XXI, p. 394, n. 127

(1860).

Scotosia lignosata, *Walker*, *Lep. Het.* XXV, p. 1361,

n. 38 (1862).

var. Scotosia erebinata, *Walker*, *Lep. Het.* XXV, p. 1358,

n. 33 (1862).

New Zealand (*Sowerby*, *Parry*, *Sinclair*, *Bolton*, *Ozley*).

Types. B.M.

The names united above undoubtedly represent but one species.

## Genus 60. TEPHROSIA, Boisduval.

*Gen. Léop. Ind.*, p. 198 (1840).112. TEPHROSIA PATULARIA. *Tab.* 10, *fig.* 8.Tephrosia patularia, *Walker*, *Lep. Het.* XXI, p. 422, n. 58

(1860).

New Zealand (*Sinclair*).

Type. B.M.

The figure on our plate does not give a satisfactory

representation of the species, being too dark; the type also

being somewhat damaged.

## 113. TEPHROSIA SCRIPTARIA.

Tephrosia scriptaria, *Walker*, *Lep. Het.* XXI, p. 422

n. 59 (1860).

New Zealand (*Parry*).

Type. B.M.

## Genus 61. GNOPHOS, Treitschke.

*Eur. Schmett.* V, 2, p. 432 (1825).

## 114. GNOPHOS PANNUARIA.

Gnophos pannularia, *Guénée*, *Ent. Mo. Mag.* V, p. 42

(1868).

Canterbury (*Fereday*).

## Family 30. ACIDALIDÆ, Guénée.

*Gen. Léop. Phal.* I, p. 422 (1857).

## Genus 62. ASTHENA, Hübner.

*Verz. bek. Schmett.*, p. 310 (1816).115. ASTHENA ONDINATA. *Tab.* 10, *fig.* 20.Asthena ondinata, *Guénée*, *Sp. Gen. Léop. Phal.* I, p. 438,n. 724; *pl.* 19, *fig.* 4 (1857).Chlorochroma plurilineata, *Walker*, *Lep. Het.* XXII,

pp. 563 &amp; 676, n. 8 (1861).

New Zealand (*Sinclair* and *Bolton*). B.M.

## 116. ASTHENA SUBPURPUREATA.

Asthena subpurpureata, *Walker*, *Lep. Het.* XXVI,

p. 1588 (1862).

Auckland (*Ozley*). Type. B.M.

117. *ASTHENA MULLATA*.

*Asthena mullata*, Guénée, *Ent. Mo. Mag.* V., p. 42 (1868).  
Canterbury (*Fereday*).

Genus 63. *ACIDALIA*,\* Treitschke.

*Eur. Schmett.* V., 2, p. 438 (1825).

118. *ACIDALIA* ? *PULCHRARIA*. *Tab.* 10, fig. 18.

*Acidalia pulchraria*, *Doubleday, Dieff. N. Zeal. App.*,  
p. 286, n. 122 (1843).

*Acidalia* ? *pulchraria*, *Walker, Lep. Hct.* XXIV., p. 780,  
n. 248 (1861).

*Ptychopoda rubropunctaria*, *Doubleday, Dieff. N. Zeal.*  
*App.*, p. 287, n. 123 (1843).

New Zealand (*Sinclair, Colenso, Bolton*). Type. B.M.

119. *ACIDALIA* ? *RUBRARIA*.

*Ptychopoda* ? *rubraria*, *Doubleday, Dieff. N. Zeal. App.*,  
p. 286, n. 12 (1843).

*Acidalia* ? *rubraria*, *Walker, Lep. Hct.* XXIV., p. 781, n.  
249 (1861).

New Zealand (*Sinclair, Bolton*). Type. B.M.

120. *ACIDALIA* *PREFECTATA*.

*Acidalia prefectata*, *Walker, Lep. Hct.* XXIV., p. 781,  
n. 250 (1861).

Auckland (*Oxley*). Type. B.M.

121. *ACIDALIA* *SCHISTARIA*.

*Acidalia schistaria*, *Walker, Lep. Hct.* XXIV., p. 782, n.  
251 (1861).

Auckland (*Oxley*). Type. B.M.

122. *ACIDALIA* *SUBTENTARIA*.

*Acidalia subtentaria*, *Walker, Lep. Hct.* XXVI., p. 1610  
(1862).

New Zealand (*Sinclair*). Type. B.M.

123. *ACIDALIA* *ABSCONDITARIA*. *Tab.* 10, fig. 21.

*Acidalia absconditaria*, *Walker, Lep. Hct.* XXVI., p. 1611  
(1862).

New Zealand (*Sinclair*). Type. B.M.

Family 31. *MICRONIDÆ*, Guénée.

*Gen. Léop. Phal.* II., p. 21 (1857).

Genus 64. *GARGAPHIA*, Walker.

*Lep. Hct.* XXVI., p. 1634 (1862).

124. *GARGAPHIA* *MURIFERATA*.

*Gargaphia muriferata*, *Walker, Lep. Hct.* XXVI., p. 1635  
(1862).

Auckland (*Oxley*). Type. B.M.

Family 32. *MACARIDÆ*, Guénée.

*Gen. Léop. Phal.* II., p. 61 (1857).

Genus 65. *MACARIA*, Curtis.

*Brit. Entom.* III., p. 132 (1826).

125. *MACARIA* ? *HUMERARIA*.

*Macaria* ? *humeraria*, *Walker, Lep. Hct.* XXIII., p. 940,  
n. 131 (1861).

New Zealand (*Sinclair*). Type. B.M.

Family 33. *FIDONIDÆ*, Guénée.

*Gen. Léop. Phal.* II., p. 95 (1857).

Genus 66. *LOZOGRAMMA*, Stephens.

*Ill. Brit. Ent. Haust.* III., p. 258, *gen.* 207 (1829).

126. *LOZOGRAMMA* *OBTUSARIA*.

*Lozogramma obtusaria*, *Walker, Lep. Hct.* XXIII., p. 985,  
n. 5 (1861).

New Zealand (*Sinclair*). Type. B.M.

Genus 67. *PANAGRA*, Guénée.

*Gen. Léop. Phal.* II., p. 126 (1857).

127. *PANAGRA* *HYPENARIA*. *Tab.* 10, fig. 10.

*Panagra hypenaria*, *Guénée, Sp. Gen. Léop. Phal.* II., p.  
128, n. 1125 (1857).

New Zealand (*Sinclair*). Type. B.M.

This species is so much like the *Deltoides* and so unlike  
the other forms in the genus, that I can scarcely believe it  
to belong to *Panagra*: I should be glad to see a genus  
formed for its reception.

128. *PANAGRA* *PROMELANARIA*.

*Panagra promelanaria*, *Walker, Lep. Hct.* XXVI., p. 1666  
(1862).

New Zealand (*Sinclair*). Type. B.M.

129. *PANAGRA* *VENIPUNCTATA*.

*Panagra venipunctata*, *Walker, Lep. Hct.* XXVI., p.  
1666 (1862).

New Zealand (*Bolton*). Type. B.M.

130. *PANAGRA* *EPHYRARIA*.

*Panagra ephyrraria*, *Walker, Lep. Hct.* XXVI., p. 1761  
(1862).

Auckland (*Oxley*).

I have been unable to find the type of this species.

131. *PANAGRA* *SCISSARIA*.

*Panagra scissaria*, *Guénée, Ent. Mo. Mag.* V., p. 43 (1868).  
Canterbury (*Fereday*).

\* This name ought properly to sink, it having been previously used by *Hübner* for a genus of butterflies (*Argynnis*, *Fabr.*)

## Genus 68. FIDONIA, Treitschke.

*Eur. Schmett. V.*, 2, p. 435 (1825).132. FIDONIA ? BREPHOSATA. *Tab. 10, fig. 3.*Fidonia ? brephosata, *Walker, Lep. Hct. XXIV.*, p. 1037,  
n. 12 (1862).New Zealand (*Earl*). Type. B.M.

## 133. FIDONIA ? ACIDALIARIA.

Fidonia ? acidaliaria, *Walker, Lep. Hct. XXIV.*, p. 1037,  
n. 13 (1862).New Zealand (*Sinclair*). Type. B.M.

## 134. FIDONIA PERORNATA.

Fidonia perornata, *Walker, Lep. Hct. XXVI.*, p. 1672  
(1862).New Zealand (*Colenso*). Type. B.M.

A very striking species, but the type is much injured.

## 135. FIDONIA ? SERVULARIA.

Fidonia ? servularia, *Guénée, Ent. Mo. Mag. V.*, p. 43  
(1868).Canterbury (*Fereday*).

## Genus 69. ASPILATES, Treitschke.

*Eur. Schmett. VI.*, I., p. 126 (1827).

## 136. ASPILATES ABROGATA.

Aspilates abrogata, *Walker, Lep. Hct. XXIV.*, p. 1075,  
n. 23 (1862).New Zealand (*Earl*). Type. B.M.137. ASPILATES ? PRIMATA. *Tab. 10, fig. 4.*Aspilates ? primata, *Walker, Lep. Hct. XXIV.*, p. 1076. n.  
26 (1862).

New Zealand. Type. B.M.

Mr. Walker gives no locality for this species, but as it is  
figured on our plate, there can be little doubt that it is a  
New Zealand species.

## 138. ASPILATES EUBOLIARIA.

Aspilates euboliaria, *Walker, Lep. Hct. XXVI.*, p. 1684  
(1862).New Zealand (*Bolton*).

I cannot find the type of this species.

## Family 34. HYBERNIDÆ, Guénée.\*

*Gen. Léop. Phal. II.*, p. 244 (1857).

## Genus 70. HYBERNIA, Latreille.

*Fam. Nat.*, p. 477 (1825).

## 139. HYBERNIA BOREOPHILARIA.

Hybernia boreophilaria, *Guénée, Ent. Mo. Mag. V.*, p. 61  
(1868).Canterbury (*Fereday*).

## Family 35. LARENTIDÆ, Guénée.

*Gen. Léop. Phal. II.*, p. 257 (1857).

## Genus 71. LARENTIA, Treitschke.

*Eur. Schmett. V.*, 2, p. 440 (1825).140. LARENTIA CLARATA. *Tab. 10, fig. 14.*Larentia clarata, *Walker, Lep. Hct. XXIV.*, p. 1197, n.  
68 (1862).New Zealand (*Earl*). Type. B.M.

## 141. LARENTIA PRODUCTATA.

Larentia productata, *Walker, Lep. Hct. XXIV.*, p. 1197,  
n. 69 (1862).Auckland (*Oxley*). Type. B.M.

## 142. LARENTIA MEGASPILOTA.

Larentia megaspilota, *Walker, Lep. Hct. XXIV.*, p. 1198,  
n. 70 (1862).Auckland (*Oxley*). Type. B.M.

## 143. LARENTIA SUBDUCTATA.

Larentia subductata, *Walker, Lep. Hct. XXIV.*, p. 1198,  
n. 71 (1862).Auckland (*Oxley*). Type. B.M.

## 144. LARENTIA INFUSATA.

Larentia infusata, *Walker, Lep. Hct. XXIV.*, p. 1199,  
n. 72 (1862).New Zealand (*Sinclair*). Type. B.M.145. LARENTIA INVEXATA. *Tab. 10, fig. 11.*Larentia invexata, *Walker, Lep. Hct. XXIV.*, p. 1199,  
n. 73 (1862).New Zealand (*Bolton*). Type. B.M.

## 146. LARENTIA SEMISIGNATA.

Larentia semisignata, *Walker, Lep. Hct. XXIV.*, p. 1200,  
n. 74 (1862).New Zealand (*Sinclair*). Type. B.M.

## 147. LARENTIA LUCIDATA.

Larentia lucidata, *Walker, Lep. Hct. XXIV.*, p. 1200,  
n. 75 (1862).New Zealand (*Sinclair*). Type. B.M.

## 148. LARENTIA ? QUADRISTRIGATA.

Larentia ? quadristrigata, *Walker, Lep. Hct. XXIV.*, p.  
1200, n. 76 (1862).New Zealand (*Bolton*). Type. B.M.\* It is a question whether *Hyberniade*, Harris (1841) ought not to be adopted; it seems to me that *Hyberniide* would be most correct.



## 149. LARENTIA CINEREARIA.

*Cidaria* ? cinerearia, *Doubleday, Dieff. N. Zeal. App. (Walker, Lep. Het. XXVI., p. 1703 (1862)).*

*Larentia inoperata, Walker, Lep. Het. XXIV., p. 1201 n. 78 (1862).*

New Zealand (*Sinclair, Bolton*). Type. B.M.

## 150. LARENTIA DIFFUSARIA.

*Larentia diffusaria, Walker, Lep. Het. XXIV., p. 1201, n. 78 (1862).*

New Zealand (*Bolton*). Type. B.M.

## 151. LARENTIA PUNCTILINEATA. Tab. 10, fig. 12.

*Larentia punctilineata, Walker, Lep. Het. XXIV., p. 1202, n. 79 (1862).*

New Zealand (*Parry, Sinclair, Bolton*). Type. B.M.

## 152. LARENTIA INTERCLUSA.

*Larentia interclusa, Walker, Lep. Het. XXIV., p. 1202, n. 80 (1862).*

## 153. LARENTIA CORCULARIA.

*Larentia corcularia, Guénée, Ent. Mo. Mag. V., p. 61 (1868).*

Canterbury (*Fereday*).

## 154. LARENTIA INFANTARIA.

*Larentia infantaria, Guénée, Ent. Mo. Mag. V., p. 62 (1868).*

Canterbury (*Fereday*).

## 155. LARENTIA CATOCALARIA.

*Larentia Catocalaria, Guénée, Ent. Mo. Mag. V., p. 26 (1868).*

Canterbury (*Fereday*).

## Genus 72. EUPITHECIA, Curtis.

*Brit. Entom. II., p. 64 (1825).*

## 156. EUPITHECIA ? BILINEOLATA.

*Eupithecia* ? bilineolata, *Walker, Lep. Het. XXIV., p. 1246, n. 100 (1862).*

Auckland (*Ozley*). Type. B.M.

## 157. EUPITHECIA ? MUSCOSATA.

*Eupithecia* ? muscosata, *Walker, Lep. Het. XXIV., p. 1246, n. 100 (1862).*

Auckland (*Ozley*). Type. B.M.

## 158. EUPITHECIA SEMIALBATA.

*Eupithecia semialbata, Walker, Lep. Het. XXVI., p. 1708 (1862).*

Auckland (*Ozley*). Type. B.M.

## 159. EUPITHECIA INEXPIATA. Tab. 10, fig. 18.

*Eupithecia inexplata, Walker, Lep. Het. XXVI., p. 1708 (1862).*

New Zealand (*Sinclair*). Type. B.M.

## 160. EUPITHECIA INDICATARIA.

*Eupithecia indicataria, Walker, Lep. Het. XXVI., p. 1708 (1862).*

New Zealand (*Colenso*). Type. B.M.

## 161. EUPITHECIA CIDARIARIA.

*Eupithecia cidariaria, Guénée, Ent. Mo. Mag. V., p. 62 (1868).*

Canterbury (*Fereday*).

## Genus 73. COREMIA, Guénée.

*Gen. Lep. Phal. II., p. 408 (1857).*

## 162. COREMIA ROSEARIA. Tab. 10, fig. 13.

*Cidaria rosearia, Doubleday, Dieff. N. Zeal. App., p. 285, n. 119 (1843).*

*Coremia rosearia, Walker, Lep. Het. XXV., p. 1313, n. 21 (1862).*

*Coremia subdaria, Guénée, Sp. Gen. Léop. Phal. II., p. 412, n. 1565 (1857).*

New Zealand (*Sinclair*). Type. B.M.

## 163. COREMIA ROBUSTARIA.

*Coremia robustaria, Walker, Lep. Het. XXV., p. 1320, n. 39 (1862).*

New Zealand (*Bolton*). Type. B.M.

## 164. COREMIA SEMIFFISSATA.

*Coremia semifissata, Walker, Lep. Het. XXV., p. 1320, n. 39 (1862).*

Auckland (*Ozley*). Type. B.M.

## 165. COREMIA PLURIMATA.

*Coremia plurimata, Walker, Lep. Het. XXV., p. 1321, n. 41 (1862).*

New Zealand (*Bolton*). Type. B.M.

## 166. COREMIA DELTOIDATA.

*Coremia Deltoidata, Walker, Lep. Het. XXV., p. 1321, n. 42 (1862).*

Auckland (*Ozley*). Type. B.M.

See Guénée's note on this species (*Ent. Mo. Mag. V., p. 64*).

## 167. COREMIA ? INDUCTATA.

*Coremia* ? inductata, *Walker, Lep. Het. XXV., p. 1322, n. 43 (1862).*

New Zealand (*Bolton*). Type. B.M.

## 163. COREMIA ARDULARIA.

*Coremia ardularia*, Guénée, *Ent. Mo. Mag. V.*, p. 63 (1868).  
Canterbury (*Fereday*).

## 169. COREMIA ? INAMENARIA.

*Coremia inamenaria*, Guénée, *Ent. Mo. Mag. V.*, p. 64 (1868).  
Canterbury (*Fereday*).

M. Guénée is not certain that this is a *Coremia* (*Ent. Mo. Mag. V.*, p. 64).

## 170. COREMIA YPSILONARIA.

*Coremia ypsilonaria*, Guénée, *Ent. Mo. Mag. V.*, p. 64 (1868).  
Canterbury (*Fereday*).

## 171. COREMIA PASTINARIA.

*Coremia pastinaria*, Guénée, *Ent. Mo. Mag. V.*, p. 64 (1868).  
Canterbury (*Fereday*).

## Genus 74. CAMPTOGRAMMA, Stephens.

*Ill. Brit. Ent. Haust. III.*, p. 263 (1829).

172. CAMPTOGRAMMA SUBOCHRARIA. *Tab. 10, fig. 16.*

*Aspilates* ? subochraria, *Doubleday, Dieff. N. Zeal. App.*,  
p. 285, n. 114 (1843).

*Camptogramma strangulata*, Guénée, *Gen. Lép. Phal. II.*,  
p. 423, n. 1586 (1857).

New Zealand (*Sinclair, Colenso, Parry, Bolton*); Auckland (*Ozley*).  
Type. B.M.

173. CAMPTOGRAMMA CORRELATA. *Tab. 10, fig. 15.*

*Camptogramma correlata*, *Walker, Lep. Het. XXV.*,  
p. 1330, n. 22 (1862).

New Zealand (*Sinclair*).  
Type. B.M.

## 174. CAMPTOGRAMMA FUSCINATA.

*Camptogramma fuscinata*, Guénée, *Ent. Mo. Mag. V.*, p. 92 (1868).

Canterbury (*Fereday*).

## 175. CAMPTOGRAMMA STINARIA.

*Camptogramma stinaria*, Guénée, *Ent. Mo. Mag. V.*, p. 92 (1868).

Canterbury (*Fereday*).

## Genus 75. DASYURIS, Guénée.

*Ent. Mo. Mag. V.*, p. 92 (1868).

## 176. DASYURIS PARTHENIATA.

*Dasyuris partheniata*, Guénée, *Ent. Mo. Mag. V.*, p. 93 (1868).

Canterbury (*Fereday*).

## Genus 76. PHIBALAPTERYX, Stephens.

*Ill. Brit. Ins. Haust. III.*, p. 256, gen. 200 (1829).

## 177. PHIBALAPTERYX SUPPRESSARIA.

*Phibalapteryx suppressaria*, *Walker, Lep. Het. XXVI.*,  
p. 1721 (1862).

Auckland (*Ozley*).  
Type. B.M.

## 178. PHIBALAPTERYX PARVULATA.

*Phibalapteryx parvulata*, *Walker, Lep. Het. XXVI.*,  
p. 1721 (1862).

New Zealand (*Bolton, Colenso*).  
Type. B.M.

## Genus 77. SCOTOSIA, Stephens.

*Ill. Brit. Ent. Haust. III.*, p. 259, gen. 201 (1829).

## 179. SCOTOSIA SUBOBSCURATA.

*Scotosiasubobs curata*, *Walker, Lep. Het. XXV.*, p. 1358,  
n. 32 (1862).

Auckland (*Ozley*).  
Type. B.M.

## 180. SCOTOSIA STIGMATICATA.

*Scotosia stigmaticata*, *Walker, Lep. Het. XXV.*, p. 1359,  
n. 35 (1862).

New Zealand (*Bolton*).  
Type. B.M.

## 181. SCOTOSIA PANAGRATA.

*Scotosia panagrata*, *Walker, Lep. Het. XXV.*, p. 1360, n.  
36 (1862).

Auckland (*Ozley*).  
Type. B.M.

## 182. SCOTOSIA DENOTATA.

*Scotosia denotata*, *Walker, Lep. Het. XXV.*, p. 1361, n. 37  
(1862).

New Zealand (*Bolton, Colenso*).  
Type. B.M.

## 183. SCOTOSIA SUBITATA.

*Scotosia subitata*, *Walker, Lep. Het. XXV.*, p. 1362, n.  
39 (1862).

New Zealand (*Bolton*).  
Type. B.M.

## 184. SCOTOSIA HUMERATA.

*Scotosia humerata*, *Walker, Lep. Het. XXV.*, p. 1362, n.  
40 (1862).

New Zealand (*Bolton*).  
Type. B.M.

## Genus 78. CIDARIA, Treitschke.

*Eur. Schmiedt. V.*, 2, p. 442 (1825).

## 185. CIDARIA INCLARATA.

*Cidaria inclarata* ♂, *Walker, Lep. Het. XXV.*, p. 1411,  
n. 75 (1862).

*Cidaria descriptata* ♀, *Walker, Lep. Het. XXV., p. 1414, n. 80 (1862).*  
Auckland (*Oxley*). Type. B.M.

#### 186. CIDARIA DESCRIPTATA.

*Cidaria descriptata* ♂, *Walker, Lep. Het. XXV., p. 1414, n. 80 (1862).*  
*var. Cidaria bisignata* ♀, *Walker, Lep. Het. XXV., p. 1415, n. 81 (1862).*  
New Zealand (*Bolton*); Auckland (*Oxley*). Types. B.M.

#### 187. CIDARIA PERDUCTATA.

*Cidaria perductata* ♂, *Walker, Lep. Het. XXV., p. 1412, n. 76 (1862).*  
*Cidaria conversata* ♂, *Walker, Lep. Het. XXV., p. 1413, n. 79 (1862).*  
New Zealand (*Parry, Colenso*). Types. B.M.

#### 188. CIDARIA CONGREGATA.

*Cidaria congregata* ♀, *Walker, Lep. Het. XXV., p. 1415, n. 82 (1862).*  
*Cidaria inclarata* ♀, *Walker, Lep. Het. XXV., p. 1411, n. 75 (1862).*  
*Cidaria aggregata* ♀, *Walker, Lep. Het. XXV., p. 1415, n. 83 (1862).*  
Auckland (*Oxley*); New Zealand (*Colenso*). Types. B.M.  
I think it quite likely that the four preceding named forms will prove to be only varieties of one species.

#### 189. CIDARIA CONGRESSATA.

*Cidaria congressata*, *Walker, Lep. Het. XXV., p. 1412, n. 77 (1862).*  
New Zealand (*Bolton*). Type. B.M.

#### 190. CIDARIA PLAGIFURCATA.

*Cidaria plagifurcata*, *Walker, Lep. Het. XXV., p. 1416, n. 84 (1862).*  
Auckland (*Oxley*). Type. B.M.

#### 191. CIDARIA SIMILATA.

*Cidaria similata*, *Walker, Lep. Het. XXV., p. 1413, n. 78 (1862).*  
New Zealand (*Bolton*). Type. B.M.

#### 192. CIDARIA ? RUDISATA.

*Cidaria rudisata*, *Walker, Lep. Het. XXV., p. 1420, n. 91 (1862).*  
New Zealand (*Bolton*). Type. B.M.

#### 193. CIDARIA ? OBTUNCATA.

*Cidaria ? obtuncata*, *Walker, Lep. Het. XXV., p. 1421, n. 92 (1862).*  
New Zealand (*Bolton*). Type. B.M.

#### 194. CIDARIA FLEXATA.

*Cidaria flexata*, *Walker, Lep. Het. XXV., p. 1421, n. 93 (1862).*  
New Zealand (*Bolton*). Type. B.M.

#### 195. CIDARIA DISSOCIATA.

*Cidaria dissociata*, *Wlk., Lep. Het. XXVI., p. 1734 (1862).*  
New Zealand (*Sinclair*). Type. B.M.

#### 196. CIDARIA SEMILISATA.

*Cidaria semilisata*, *Walker, Lep. Het. XXVI., p. 1735 (1862).*  
New Zealand (*Bolton*). Type. B.M.

#### 197. CIDARIA PYRAMARIA.

*Cidaria pyramaria*, *Guénée, Ent. Mo. Mag. V., p. 93 (1868).*  
Canterbury (*Fereday*).

#### 198. CIDARIA DELICATULATA.

*Cidaria delicatula*, *Guénée, Ent. Mo. Mag. V., p. 94 (1868).*  
Canterbury (*Fereday*).

#### 199. CIDARIA BULBULATA.

*Cidaria bulbula*, *Guénée, Ent. Mo. Mag. V., p. 94 (1868).*  
Canterbury (*Fereday*).

Genus 79. *HELASTIA*, *Guénée, Ent. Mo. Mag. V., p. 94 (1868).*

#### 200. *HELASTIA* EUPITHECIARIA.

*Helastia eupitheciaria*, *Guénée, Ent. Mo. Mag. V., p. 95 (1868).*  
Canterbury (*Fereday*).

#### Genus 80. TATOSOMA, *n. gen.*

Primaries ample, subtriangular, the costa long, slightly waved, outer margin subangulated below the apex, inner margin convex, very short; costal nervure terminating at second third of costa; subcostal five-branched, the first branch emitted before end of post discoidal cellule, fifth branch emitted from below the nervure; upper discocellular triangulated, lower shorter, concave, the two together forming a deep irregular sinus; discoidals emitted from discocellulars; first median branch emitted from median nervure just beyond the middle, second and third branches near together at end of cell; secondaries small, pyriform; costal nervure scarcely visible, subcostal three-branched, the second and third branches emitted near together at end of cell; discocellulars together forming a regular sinus; first median branch invisible; the abdominal margin extremely short and converted into a kind of pocket, body long, slender, extending far beyond the wings, palpi and legs long and slender.

Type. *T. agrionata* (*var. tipulata*, *Wlk.*)

## CIDARIA Group 2, Walker.

## 201. TATOSOMA LESTEVATA.

*Cidaria lestevata*, *Walker, Lep. Het. XXV.*, p. 1416, n. 85 (1862).  
Auckland (*Oxley*); New Zealand (*Churton*). Type. B.M.

## 202. TATOSOMA AGRIONATA.

*Cidaria agrionata*, *Walker, Lep. Het. XXV.*, p. 1417, n. 86 (1862).  
*Cidaria tipulata*, *Walker, Lep. Het. XXV.*, p. 1417, n. 87 (1862).  
*Cidaria inclinatoria*, *Walker, Lep. Het. XXV.*, p. 1418, n. 88 (1862).  
*var. Cidaria collectaria*, *Walker, Lep. Het. XXV.*, p. 1419 n. 89 (1862).  
New Zealand (*Colenso*, *Sinclair*, *Churton*); Auckland (*Oxley*). Types. B.M.

## 203. TATOSOMA TRANSITARIA.

*Cidaria transitaria*, *Walker, Lep. Het. XXV.*, p. 1419, n. 90 (1862). ? *Taylor's New Zealand*, pl. 1, fig. 7 (1855).  
New Zealand (*Colenso*). Type. B.M.  
It is difficult to say whether Taylor's figure represents this or the preceding species.

Genus 81. CHALASTRA, Walker.  
*Lep. Het. XXV.*, p. 1429, gen. 33 (1862).

## 204. CHALASTRA PELLURGATA.

*Chalastra pellurgata*, *Walker, Lep. Het. XXV.*, p. 1430, n. 1 (1862).  
Auckland (*Oxley*). Type. B.M.

Genus 82. ELVIA, Walker.  
*Lep. Het. XXV.*, p. 1430, gen. 34 (1862).

## 205. ELVIA GLAUCATA.

*Elvia glaucata*, *Walker, Lep. Het. XXV.*, p. 1431, n. 1 (1862).  
Auckland (*Oxley*); New Zealand (*Colenso*). Type. B.M.

Tribe 6. CRAMBITES, Stainton.

Family 36. PHYCIDÆ, Guénée.

Genus 83. HYPOCHALCIA, Hübner.  
*Verz. bek. Schmett.*, p. 368 (1816).

## 206. HYPOCHALCIA SUBMARGINALIS.

*Hypochalcia submarginalis*, *Walker, Lep. Het. XXVII.*, p. 48, n. 22 (1863).  
New Zealand (*Sinclair*, *Bolton*). Type. B.M.

## 207. HYPOCHALCIA INDISTINCTALIS.

*Hypochalcia indistinctalis*, *Walker, Lep. Het. XXVII.*, p. 48, n. 23 (1863).  
New Zealand (*Bolton*). Type. B.M.

Genus 84. NEPHOPTERYX, Hübner.  
*Verz. bek. Schmett.*, p. 370 (1816).

## 208. NEPHOPTERYX MAORIELLA.

*Nephoteryx Maoriella*, *Walker, Lep. Het. Suppl. V.*, p. 1720 (1866).  
New Zealand (*Bolton*). Type. B.M.

## 209. NEPHOPTERYX SUBDITELLA.

*Nephoteryx subditella*, *Walker, Lep. Het. Suppl. V.*, p. 1720 (1866).  
New Zealand (*Bolton*). Type. B.M.

Genus 85. GADIRA, Walker.  
*Lep. Het. Suppl. V.*, p. 1742 (1866).

## 210. GADIRA ACERELLA.

*Gadira acerella*, *Wlk., Lep. Het. Suppl. V.*, p. 1742 (1866).  
Auckland (*Oxley*). Type. B.M.

Family 37. CRAMBIDÆ, Stainton.  
*Manual Brit. Moths II.*, p. 178 (1859).

Genus 86. CRAMBUS, Fabricius.  
*Ent. Syst. Suppl.*, p. 420 (1798).

## 211. CRAMBUS FLEXUOSELLUS.

*Crambus flexuosellus*, *Doubleday, Dieff. N. Zcal. App.*, p. 289, n. 130 (1843).  
New Zealand (*Bolton*, *Sinclair*, *Ross*); Auckland (*Oxley*). Type. B.M.

## 212. CRAMBUS VITELLUS.

*Crambus vitellus*, *Doubleday, Dieff. N. Zcal. App.*, p. 289, n. 131 (1843).  
New Zealand (*Bolton*, *Sinclair*); Auckland (*Oxley*). Type. B.M.

## 213. CRAMBUS RAMOSELLUS.

*Crambus ramosellus*, *Doubleday, Dieff. N. Zcal. App.*, p. 288, n. 129 (1843).  
New Zealand (*Bolton*, *Sinclair*, *Parry*). Type. B.M.

## 214. CRAMBUS NEXALIS.

*Crambus nexalis*, *Walker, Lep. Het. XXVII.*, p. 178, n. 137 (1863).  
Auckland (*Oxley*); New Zealand (*Sinclair*). Type. B.M.



## 215. CRAMBUS TRANSCISSALIS.

*Crambus transcissalis*, *Walker, Lep. Het. XXVII.*, p. 178, n. 138 (1863).  
New Zealand (*Sinclair*). Type. B.M.

## 216. CRAMBUS SABULOSELLUS.

*Crambus sabulosellus*, *Walker, Lep. Het. XXVII.*, p. 178, n. 138 (1863).  
New Zealand (*Sinclair*). Type. B.M.

Genus 87. EROMENE, Hübner.  
*Verz. bek. Schmett.*, p. 256 (1816).

## 217. EROMENE AURISCRIPTELLA.

*Eromene auriscriptella*, *Walker, Lep. Het. XXX.*, p. 976 (1864).  
New Zealand (*Bolton*). Type. B.M.

## 218. EROMENE LEPIDELLA.

*Eromene lepidella*, *Walker, Lep. Het. Suppl. V.*, p. 1761 (1866).  
Auckland (*Oxley*). Type. B.M.  
A beautiful little species, with metallic spots on primaries.

## 219. EROMENE BIPUNCTELLA.

*Eromene bipunctella*, *Wlk., Lep. Het. Suppl. V.*, p. 1761 (1866).  
New Zealand (*Bolton*). Type. B.M.

Genus 88. SAMANA, Walker.  
*Lep. Het. XXVII.*, p. 197, gen. 23 (1863).

## 220. SAMANA FALCATELLA.

*Samana falcateLLa*, *Walker, Lep. Het. XXVII.*, p. 197, n. 1 (1863).  
New Zealand (*Colenso*). Type. B.M.

Genus 89. ADENA, Walker.  
*Lep. Het. XXVII.*, p. 197, gen. 24 (1863).

## 221. ADENA XANTHALIS.

*Adena xanthalis*, *Walker, Lep. Het. XXVII.*, p. 198, n. 1 (1863).  
Auckland (*Oxley*). Type. B.M.

## Tribe 7. TORTRICITES, Walker.

Family 38. TORTRICIDÆ, Stephens.  
*Ill. Brit. Ins. Haust. fam. XVII* (1829).

Genus 90. TERAS, Treitschke.  
*Eur. Schmett. VII.*, p. 233 (1829).

## 222. TERAS OBLIQUANA.

*Teras obliquana*, *Walker, Lep. Het. XXVIII.*, p. 302, n. 70 (1863).  
New Zealand (*Bolton*). Type. B.M.

## 223. TERAS EXCESSANA.

*Teras excessana*, *Walker, Lep. Het. XXVIII.*, p. 303, n. 71 (1863).  
Auckland (*Oxley*). Type. B.M.

## 224. TERAS OBLONGANA.

*Teras oblongana*, *Walker, Lep. Het. XXVIII.*, p. 303, n. 72 (1863).  
Auckland (*Oxley*). Type. B.M.

## 225. TERAS INAPTANA.

*Teras inaptana*, *Walker, Lep. Het. XXVIII.*, p. 304, n. 73 (1863).  
Auckland (*Oxley*). Type. B.M.

## 226. TERAS INCESSANA.

*Teras incessana*, *Walker, Lep. Het. XXVIII.*, p. 304, n. 74 (1863).  
Auckland (*Oxley*); New Zealand (*Bolton*). Type. B.M.  
Very similar to the preceding species.

## 227. TERAS SPURCATANA.

*Teras spurcatana*, *Walker, Lep. Het. XXVIII.*, p. 305, n. 75 (1863).  
Auckland (*Oxley*). Type. B.M.

## 228. TERAS BIGUTTANA.

*Teras biguttana*, *Walker, Lep. Het. XXVIII.*, p. 305, n. 76 (1863).  
Auckland (*Oxley*). Type. B.M.

## 229. TERAS CONDITANA.

*Teras conditana*, *Walker, Lep. Het. XXVIII.*, p. 306, n. 77 (1863).  
Auckland (*Oxley*). Type. B.M.

## 230. TERAS SERVANA.

*Teras servana*, *Walker, Lep. Het. XXVIII.*, p. 306, n. 78 (1863).  
New Zealand (*Bolton*). Type. B.M.  
The type of this species is much broken and rubbed.

## 231. TERAS SEMIFERANA.

*Teras semiferana*, *Walker, Lep. Het. XXVIII.*, p. 306, n. 79 (1863).  
New Zealand (*Bolton*). Type. B.M.

## 232. TERAS PRISCANA.

*Teras priscana*, *Walker, Lep. Het. XXVIII.*, p. 307, n. 80 (1863).  
*Sciaphila spoliata*, *Walker, Lep. Het. XXVIII.*, p. 356, n. 73 (1863).

- Pædisca morosana*, *Wlk., Lep. Het. XXVIII*, p. 382, n. 84 (1863).  
New Zealand (*Bolton*). Type. B.M.  
Very much like *T. servana*.

233. *TERAS ANTIQUANA*.

- Teras antiquana*, *Wlk., Lep. Het. XXVIII*, p. 307, n. 81 (1863).  
*Sciaphila fusiferana*, *Walker, Lep. Het. XXVIII*, p. 355, n. 70 (1863).  
New Zealand (*Bolton*). Type. B.M.  
Allied to *T. servana*.

234. *TERAS CONGESTANA*.

- Teras congestana*, *Walker, Lep. Het. XXVIII*, p. 308, n. 82 (1863).  
New Zealand (*Bolton*). Type. B.M.  
Apparently only a dark example of *T. priscana*.

235. *TERAS ? MAORIANA*.

- Teras ? Maoriana*, *Walker, Lep. Het. XXVIII*, p. 308, n. 83 (1863).  
New Zealand (*Bolton*). Type. B.M.

236. *TERAS ? ACCENSANA*.

- Teras ? accensana*, *Wlk., Lep. Het. XXX*, p. 983 (1864).  
New Zealand (*Bolton*). Type. B.M.

237. *TERAS ? PUNCTILINEANA*.

- Teras punctilineana*, *Walker, Lep. Het. Suppl. V*, p. 1780 (1866).  
New Zealand (*Bolton*). Type. B.M.  
A large broad-winged species; it can scarcely be a *Teras* I think.

238. *TERAS CUNEIFERANA*.

- Teras cuneiferana*, *Walker, Lep. Het. Suppl. V*, p. 1780 (1866).  
New Zealand (*Bolton*). Type. B.M.

239. *TERAS PAUCULANA*.

- Teras pauculana*, *Walker, Lep. Het. Suppl. V*, p. 1781 (1866).  
New Zealand (*Sinclair*). Type. B.M.  
The type specimen of this insignificant little species is in poor condition.

240. *TERAS CONTRACTANA*.

- Teras contractana*, *Walker, Lep. Het. Suppl. V*, p. 1782 (1866).  
New Zealand (*Sinclair*). Type. B.M.

241. *TERAS ? ABJECTANA*.

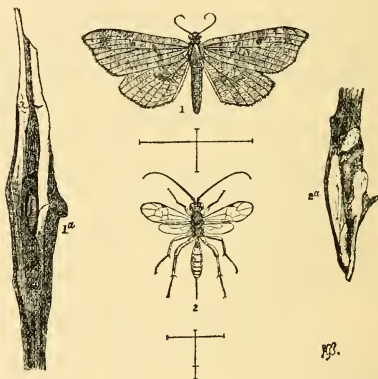
- Teras ? abjectana*, *Walker, Lep. Het. Suppl. V*, p. 1781 (1866).  
New Zealand (*Bolton*). Type much injured. B.M.

- Genus 91. *PANDEMIS*, Hübner.  
*Verz. bck. Schmett.*, p. 388 (1816).

242. *PANDEMIS GAVISANA*.

- Pandemis gavisana*, *Walker, Lep. Het. XXVIII*, p. 312, n. 14 (1863).  
New Zealand (*Bolton*). Type. B.M.

- Genus 92. *CACOEZIA*, Hübner.  
*Verz. bck. Schmett.*, p. 388 (1816).



243. *CACOEZIA ? GALICOLENS*, n. sp.

Primaries same form as *C. podana*; secondaries with outer margin more arched in the middle; darker or lighter clay-coloured reticulated with fuscous, two transverse dusky parallel streaks, the outer one crossing the discocellulars of both wings (under a lens these streaks disappear, leaving only a spot at terminations of discoidal cells); a dusky subapical costal spot on primaries; body above clay-coloured, pterygodes dusky; wings below paler, the reticulations and transverse bands red-brown, well-defined, a blackish grey spot on discocellulars; body paler than above; expanse of wings 9 to 11½ lines.

This species may possibly be referable to a distinct genus, but the specimens are not in sufficiently good condition to enable me to assert positively that they are distinct from *Cacoezia*; the secondaries are certainly wider than in any species that I have seen, the outer margin being more distinctly waved; the palpi are wanting, and the wings, in my larger example, somewhat folded so as to obscure the neurulation.

The history of this species is very interesting as it seems to be a gall-producer, several species of *Tortriciæ* are known to breed in galls of other insects, but this little moth is an independent animal; it has been handed over to me for description by Mr. Albert Müller, the present Director of the Zoological Gardens at Basle, having been received by him from Mr. C. M. Wakefield of Christchurch.

The following is an extract from the letter which accompanied the galls and specimens—

“Christchurch, New Zealand,

“September 27th, 1873.

“By this mail I am forwarding to you a little box, containing a number of galls, which, I trust, will be interesting to you. Amongst them you will find a glass tube, containing two moths and two ichneumons which were bred from similar galls last year; unfortunately, I forgot them until it was too late, and they are, I fear, too much damaged for you to describe from. The galls however contain larvae, which may perhaps live and be bred out on the voyage.

“They are very abundant, and occur on a rather pretty creeping plant of which I do not know the name. . . . The galls in the box were only gathered last week.”

Unfortunately no moths were bred out on the voyage; the letter reached England Jan. 12th, 1873, and the pupæ *in situ* are evidently dead.

The larva seems to feed upon the pith and causes the stem to swell, so as to produce a fusiform gall; it forms a light silk cocoon within the centre of the swelling, the frass being apparently gummed on to the thread; the chrysalis is of a bright mahogany colour and about  $3\frac{1}{2}$  lines in length. The large round hole through which the insect escapes is evidently produced by the larva.

The ichneumon fly parasitic upon this species, belongs to the genus *Mesoleptus*\*, it is more nearly allied to *M. atomator* than to any other described species, but differs in its more slender build, in having the scutellum and post-scutellum black like the remainder of the thorax; the basal two-thirds of the first segment of abdomen black; the antennæ jet black and the entire insect darker in colour†; expanse of wings  $5\frac{1}{2}$  lines. I propose to name this little species *M. Mülleri*.

#### Genus 93. BATODES, Guénée.

##### 244. BATODES JACTATANA.

*Batodes Jactatana*, Walker, *Lep. Het.* XXVIII., p. 317, n. 6 (1863).

Auckland (*Osley*); New Zealand (*Colenso*). Type. B.M.

#### Genus 94. TORTRIX, Treitschke.

*Eur. Schnett.* VII., p. 228 (1829).

##### 245. TORTRIX ? INNOTATANA.

*Tortrix* ? *innotatana*, Walker, *Lep. Het.* XXVIII., p. 333, n. 61 (1863).

Auckland (*Osley*).

I am unable to decide whether or not the species is a true *Tortrix*, as I have not seen the type.

#### Genus 95. SCIAPHILA, Treitschke.

*Eur. Schnett.* VII., p. 233 (1829).

##### 246. SCIAPHILA FLEXIVITTANA.

*Sciaphila flexivittana*, Walker, *Lep. Het.* XXVIII., p. 353, n. 67 (1863).

Auckland (*Bolton*).

Type. B.M.

##### 247. SCIAPHILA TRANSTRIGANA.

*Sciaphila transtrigana*, Walker, *Lep. Het.* XXVIII., p. 354, n. 68 (1863).

Auckland (*Osley*).

Type. B.M.

##### 248. SCIAPHILA TURBULENTANA.

*Sciaphila turbulenta*, Walker, *Lep. Het.* XXVIII., p. 355, n. 69 (1863).

Auckland (*Osley*).

Type. B.M.

##### 249. SCIAPHILA DETRITANA.

*Sciaphila detritana*, Walker, *Lep. Het.* XXVIII., p. 356, n. 71 (1863).

New Zealand (*Bolton*).

Type. B.M.

##### 250. SCIAPHILA SERVLISANA.

*Sciaphila servilisana*, Walker, *Lep. Het.* XXVIII., p. 356, n. 72 (1863).

New Zealand (*Bolton*).

Type. B.M.

##### 251. SCIAPHILA INFIMANA.

*Sciaphila infimana*, Walker, *Lep. Het.* XXVIII., p. 357, n. 74 (1863), XXX., p. 986 (1864).

New Zealand (*Bolton*).

Type. B.M.

A small obscure species.

##### 252. SCIAPHILA SAXANA.

*Sciaphila saxana*, Walker, *Lep. Het.* XXVIII., p. 357, n. 75 (1863).

New Zealand (*Bolton*).

Type. B.M.

#### Genus 96. OLINDIA, Guénée.

##### 253. OLINDIA ? VETUSTANA.

*Olindia* ? *vetustana*, Walker, *Lep. Het.* XXVIII., p. 358, n. 4 (1863).

New Zealand (*Bolton*).

Type. B.M.

A pretty white and brown species.

\* I have to thank Mr. F. Smith for referring me to the genus.

† This may be due to the manner in which the specimens were killed.

## Genus 97. CONCHYLIS, Sodoffsky.

*Bull. Mosc.*, p. 22 (1837).

## 254. CONCHYLIS PLAGIATANA.

Conchylis plagiata, *Walker, Lep. Het. XXVIII.*, p. 370, n. 131 (1863).Auckland (*Ozley*). Type. B.M.

## 255. CONCHYLIS LEUCANIANA.

Conchylis leucaniana, *Walker, Lep. Het. XXVIII.*, p. 370, n. 132 (1863).New Zealand (*Bolton, Sinclair*). Type. B.M.

## 256. CONCHYLIS RECUSANA.

Conchylis recusana, *Walker, Lep. Het. XXVIII.*, p. 371, n. 133 (1863).New Zealand (*Bolton*). Type. B.M.

## 257. CONCHYLIS MARGINANA.

Conchylis marginana, *Walker, Lep. Het. XXVIII.*, p. 371, n. 134 (1863).New Zealand (*Bolton*). Type. B.M.

## Genus 98. PÆDISCA, Treitschke.

*Eur. Schmett.* VIII, p. 188 (1830).

## 258. PÆDISCA LUCIPLAGANA.

Pædisca luciplagana, *Walker, Lep. Het. XXVIII.*, p. 381, n. 83 (1863).Auckland (*Ozley*). Type. B.M.

## 259. PÆDISCA PRIVATANA.

Pædisca privatana, *Walker, Lep. Het. XXVIII.*, p. 382, n. 85 (1863).New Zealand (*Bolton*). Type. B.M.This seems allied to *Teras priscana*, *antiquana*, *congestana*, and *Maoriana*, but I have not sufficiently studied the group to say whether or not it is referable to that genus.

## Genus 99. GRAPHOLITA ABNEGATANA.

*Eur. Schmett.* VII, I, p. 231 (1829).

## 260. GRAPHOLITA ABNEGATANA.

Grapholita abnegatana, *Walker, Lep. Het. XXX.*, p. 991 (1864).New Zealand (*Bolton*). Type. B.M.

## Genus 100. ARGUA, Walker.

*Lep. Het. XXVIII.*, p. 448, gen. 63 (1863).

## 261. ARGUA SCABRA.

Argua scabra, *Walker, Lep. Het. XXVIII.*, p. 448, n. 1 (1863).Auckland (*Ozley*). Type. B.M.

## Genus 101. SIMAËTHIS, Leach.

*Sam. Comp.*, p. 254 (1819).

## 262. SIMAËTHIS COMBINATANA.

Simaëthis combinatana, *Walker, Lep. Het. XXX.*, p. 456, n. 15 (1864).New Zealand (*Bolton*). Type. B.M.

## 263. SIMAËTHIS ? ABSTITELLA.

Simaëthis ? abstitella, *Walker, Lep. Het. XXX.*, p. 997 (1864).New Zealand (*Bolton*). Type. B.M.

## Tribe 8. TINEITES, Latreille.

## Family 39. TINEIDÆ, Leach.

*Sam. Comp.*, p. 248 (1819).

## Genus 102. TINEA, Fabricius.

*Syst. Ent.*, p. 655 (1775).

## 264. TINEA RECTELLA.

Tinea rectella, *Walker, Lep. Het. XXVIII.*, p. 482, n. 91 (1863).Auckland (*Ozley*); New Zealand (*Ross*). Type. B.M.

## 265. TINEA CERTELLA.

Tinea certella, *Walker, Lep. Het. XXVIII.*, p. 484, n. 95 (1863).New Zealand (*Bolton*). Type. B.M.

## 266. TINEA PLAGIATELLA.

Tinea plagiata, *Walker, Lep. Het. XXVIII.*, p. 485, n. 96 (1863).New Zealand (*Bolton*). Type. B.M.

## 267. TINEA ADMOTELLA.

Tinea admotella, *Walker, Lep. Het. XXVIII.*, p. 485, n. 97 (1863).New Zealand (*Bolton*). Type. B.M.

## 268. TINEA ? DEROGATELLA.

Tinea ? derogatella, *Walker, Lep. Het. XXVIII.*, p. 485, n. 98 (1863).Auckland (*Ozley*). Type. B.M.

## 269. TINEA BISIGNELLA.

Tinea bisignella, *Wlk., Lep. Het. XXX.*, p. 1007 (1864).Auckland (*Ozley*). Type. B.M.

## 270. TINEA PUSILELLA.

Tinea pusilella, *Walker, Lep. Het. XXX.*, p. 1008 (1864).New Zealand (*Bolton*). Type. B.M.



271. *TINEA MAORIELLA*.

*Tinea Maoriella*, *Wlk., Lep. Het. XXX.*, p. 1008 (1864).  
New Zealand (*Bolton*). Type. B.M.

272. *TINEA CONTACTELLA*.

*Tinea contactella*, *Walker, Lep. Het. Suppl. V.*, p. 1813 (1866).

Auckland (*Oxley*). Type. B.M.  
A little grey and white species.

Genus 103. *INCURVARIA*, Haworth.

*Lep. Brit.*, pt. IV., p. 559 (1828).

273. *INCURVARIA BASELLA*.

*Incurvaria basella*, *Walker, Lep. Het. XXVIII.*, p. 492, n. 19 (1863).

New Zealand (*Bolton*). Type. B.M.

Genus 104. *SABATINCA*, Walker.

*Lep. Het. XXVIII.*, p. 511, gen. 26 (1863).

274. *SABATINCA INCONGRUELLA*.

*Sabatinka incongruella*, *Walker, Lep. Het. XXVIII.*, p. 511, n. 1 (1863).

Auckland (*Oxley*). Type. B.M.

Genus 105. *CEROSTOMA*, Latreille.

*Hist. Ins.* III., p. 416 (1802).

275. *CEROSTOMA TERMINELLA*.

*Cerostoma terminella*, *Walker, Lep. Het. XXVIII.*, p. 548, n. 20 (1863).

New Zealand (*Bolton*). Type. B.M.

276. *CEROSTOMA FULGURATELLA*.

*Cerostoma fulguratella*, *Walker, Lep. Het. XXVIII.*, p. 548, n. 21 (1863).

Auckland (*Oxley*). Type. B.M.

Genus 106. *GELECHIA*, Hübner.

*Verz. bek. Schmett.*, p. 415 (1816).

277. *GELECHIA CONSPICUELLA*.

*Gelechia conspicuella*, *Walker, Lep. Het. XXIX.*, p. 651, n. 369 (1864).

Auckland (*Oxley*). Type. B.M.

278. *GELECHIA INNOTELLA*.

*Gelechia innotella*, *Walker, Lep. Het. XXIX.*, p. 652, n. 370 (1864).

New Zealand (*Bolton*). Type. B.M.

279. *GELECHIA INTACTELLA*.

*Gelechia intactella*, *Walker, Lep. Het. XXIX.*, p. 652, n. 371 (1864).

New Zealand (*Bolton*). Type. B.M.

280. *GELECHIA MONOSPILELLA*.

*Gelechia monospilella*, *Walker, Lep. Het. XXIX.*, p. 653, n. 372 (1864).

New Zealand (*Bolton*). Type. B.M.

281. *GELECHIA ADAPERTELLA*.

*Gelechia adapertella*, *Walker, Lep. Het. XXIX.*, p. 653, n. 373 (1864).

New Zealand (*Bolton*). Type much damaged. B.M.

282. *GELECHIA ADREPTELLA*.

*Gelechia adreptella*, *Walker, Lep. Het. XXIX.*, p. 654, n. 374 (1864).

New Zealand (*Bolton*). Type. B.M.

283. *GELECHIA SUBLITELLA*.

*Gelechia sublitella*, *Walker, Lep. Het. XXIX.*, p. 654, n. 375 (1864).

New Zealand (*Sinclair*). Type. B.M.

284. *GELECHIA DEAMATELLA*.

*Gelechia deamatella*, *Walker, Lep. Het. XXIX.*, p. 654, n. 376 (1864).

Auckland (*Oxley*). Type. B.M.

285. *GELECHIA FLAVIDELLA*.

*Gelechia flavidella*, *Walker, Lep. Het. XXIX.*, p. 655, n. 377 (1864).

New Zealand (*Bolton*). Type. B.M.

286. *GELECHIA COLLITELLA*.

*Gelechia collitella*, *Walker, Lep. Het. XXIX.*, p. 655, n. 378 (1864).

New Zealand (*Bolton*). Type. B.M.

287. *GELECHIA CONVULSELLA*.

*Gelechia convulsella*, *Walker, Lep. Het. XXIX.*, p. 656, n. 379 (1864).

Auckland (*Oxley*). Type. B.M.

288. *GELECHIA CONTEXTELLA*.

*Gelechia contextella*, *Walker, Lep. Het. XXIX.*, p. 656, n. 380 (1864).

Auckland (*Oxley*). Type. B.M.

289. *GELECHIA CONTRITELLA*.

*Gelechia contritella*, *Walker, Lep. Het. XXIX.*, p. 657, n. 381 (1864).

Auckland (*Oxley*). Type. B.M.

## 290. GELECHIA SUBDITELLA.

*Gelechia subditella*, *Walker, Lep. Het. XXIX.*, p. 657, n. 382 (1864).  
New Zealand (*Ross*). Type. B.M.

## 291. GELECHIA BIFACIELLA.

*Gelechia bifaciella*, *Walker, Lep. Het. XXIX.*, p. 657, n. 383 (1864).  
New Zealand (*Bolton*). Type. B.M.

## 292. GELECHIA PERONEANELLA.

*Gelechia peroneanella*, *Walker, Lep. Het. XXIX.*, p. 658, n. 384 (1864).  
New Zealand (*Bolton*); Auckland (*Ozley*). Type. B.M.  
A very pretty black-speckled green species.

## 293. GELECHIA APPARITELLA.

*Gelechia apparitella*, *Walker, Lep. Het. XXX.*, p. 1027 (1864).  
New Zealand (*Bolton*). Type. B.M.

## 294. GELECHIA COPIOSELLA.

*Gelechia copiosella*, *Walker, Lep. Het. XXX.*, p. 1028, (1864).  
Auckland (*Ozley*). Type. B.M.

## Genus 107. ECOPHORA, Latreille.

*Préc. d. car.*, p. 146 (1796).

## 295. ECOPHORA APERTELLA.

*Ecophora apertella*, *Walker, Lep. Het. XXIX.*, p. 698, n. 93 (1864).  
Auckland (*Ozley*). Type. B.M.

## 296. ECOPHORA ARMIGERELLA.

*Ecophora armigerella*, *Walker, Lep. Het. XXIX.*, p. 698, n. 94 (1864).  
New Zealand (*Bolton*). This species is unknown to me.

## 297. ECOPHORA ADEMPTELLA.

*Ecophora ademptella*, *Walker, Lep. Het. XXIX.*, p. 698, n. 95 (1864).  
New Zealand (*Bolton*). Type. B.M.  
Only the primaries and thorax of the type remain.

## 298. ECOPHORA PICARELLA.

*Ecophora picarella*, *Walker, Lep. Het. XXIX.*, p. 699, n. 96 (1864).  
New Zealand (*Churton*); Auckland (*Ozley*). Type. B.M.

## 299. ECOPHORA HAMATELLA.

*Ecophora hamatella*, *Walker, Lep. Het. XXIX.*, p. 700, n. 97 (1864).  
Auckland (*Ozley*). Type. B.M.

## Genus 108. CRYPTOLECHIA, Zeller.

## 300. CRYPTOLECHIA COARCTATELLA.

*Cryptolechia coarctatella*, *Walker, Lep. Het. XXIX.*, p. 768, n. 153 (1863).  
Auckland (*Ozley*). Type. B.M.

## 301. CRYPTOLECHIA COLLIGATELLA.

*Cryptolechia colligatella*, *Walker, Lep. Het. XXIX.*, p. 768, n. 154 (1863).  
New Zealand (*Bolton*). Type. B.M.

## 302. CRYPTOLECHIA LICHENELLA.

*Cryptolechia lichenella*, *Walker, Lep. Het. XXIX.*, p. 769, n. 155 (1863).  
New Zealand (*Sinclair*). Type. B.M.  
Very like the species of the genus *Hyponomeuta*.

## Genus 109. IZATHA, Walker.

*Lep. Het. XXIX.*, p. 786, gen. 74 (1863).

## 303. IZATHA ATTACTELLA.

*Izatha attactella*, *Walker, Lep. Het. XXIX.*, p. 787, n. 1 (1863).  
New Zealand (*Bolton, Sinclair*). Type. B.M.

## Genus 110. TINGENA, Walker.

*Lep. Het. XXIX.*, p. 809, gen. 102 (1864).

## 304. TINGENA BIFACIELLA.

*Tingena bifaciella*, *Walker, Lep. Het. XXIX.*, p. 810, n. 1 (1864).  
New Zealand (*Bolton*). Type. B.M.

## Genus 111. VANICELA, Walker.

*Lep. Het. XXX.*, p. 1039, (1864).

## 305. VANICELA DISJUNCTELLA.

*Vanicela disjunctella*, *Walker, Lep. Het. XXX.*, p. 1039 (1864).  
New Zealand (*Bolton*).  
I have not seen the type.

## Family 40. GLYPHYPTERYGIDÆ, Stainton.

*Man. Brit. Moths II.*, p. 362 (1859).

## Genus 112. GLYPHYPTERYX, Hübner.

*Verz. bek. Schmett.*, p. 421 (1816).

## 306. GLYPHYPTERYX EXTERNELLA.

*Glyphipteryx externella*, *Walker, Lep. Het. XXX., p. 841, n. 9* (1864).

New Zealand (*Bolton*). Type ? B.M.  
The only example in the collection is from Auckland and measures only 5 lines in expanse of wings.

## 307. GLYPHYPTERYX SCINTELELLA.

*Glyphipteryx scintellella*, *Walker, Lep. Het. XXX., p. 841, n. 10* (1864).

New Zealand (*Bolton*). Type. B.M.

## Family 41. ARGYRESTHIDÆ, Stainton.

*Man. Brit. Moths II., p. 368* (1859).

## Genus 113. ARGYRESTHIA, Hübner.

*Verz. bek. Schmett., p. 422* (1816).

## 308. ARGYRESTHIA TRANSVERSELLA.

*Argyresthia transversella*, *Walker, Lep. Het. XXX., p. 849, n. 132* (1864).

Auckland (*Oxley*).  
The type of this species is missing.

## 309. ARGYRESTHIA STILBELLÆ.

*Argyrosetia stilbella*, *Doubleday, Dicff. N. Zeal. App., p. 289, n. 132* (1843).

*Argyresthia stilbella*, *Walker, Lep. Het. XXX., p. 849, n. 36* (1864).

New Zealand (*Sinclair*).  
The type is missing.

## Family 42. GRACILARIIDÆ, Stainton.

*Man. Brit. Moths II., p. 374* (1859).

## Genus 114. GRACILARIA, Haworth.

*Lep. Brit., pt. IV., p. 527* (1828).

## 310. GRACILARIA FRONTELLA.

*Gracilaria frontella*, *Walker, Lep. Het. XXX., p. 856, n. 41* (1864).

New Zealand (*Bolton*).  
The type is missing.

## 311. GRACILARIA ARENOSELLA.

*Gracilaria arenosella*, *Walker, Lep. Het. XXX., p. 857, n. 42* (1864).

New Zealand (*Bolton*). Type. B.M.

## Family 43. ELACHISTIDÆ, Stainton.

*Man. Brit. Moths II., p. 393* (1859).

## Genus 115. ELACHISTA, Treitschke.

*Eur. Schmett. IX., 2, p. 177* (1833).

## 312. ELACHISTA SUPPAGONELLA.

*Elachista suppagonella*, *Walker, Lep. Het. XXX., p. 898, n. 94* (1864).

New Zealand (*Sinclair, Bolton*).

The specimens are missing.

## Family 44. PTEROPHORIDÆ, Zeller.

*Isis, p. 755* (1841).

## Genus 116. PLATYPTILUS, Zeller.

*Isis, p. 764* (1841).

## 313. PLATYPTILUS FALCOTALIS.

*Platyptilus falcatalis*, *Walker, Lep. Het. XXX., p. 931, n. 15* (1864).

Auckland (*Oxley*). Type. B.M.

## 314. PLATYPTILUS REPLETALIS.

*Platyptilus repletalis*, *Walker, Lep. Het. XXX., p. 931, n. 16* (1864).

New Zealand (*Bolton, Sinclair*). Type. B.M.

## Genus 117. PTEROPHORUS, Geoffroy.

*Hist. d. Ins. II., p. 90* (1764).

## 315. PTEROPHORUS INNOTATALIS.

*Pterophorus innotatalis*, *Walker, Lep. Het. XXX., p. 945, n. 57* (1864).

Auckland (*Oxley*). Type. B.M.

## 316. PTEROPHORUS DEPRIVATALIS.

*Pterophorus deprivatalis*, *Walker, Lep. Het. XXX., p. 946, n. 58* (1864).

New Zealand (*Bolton*). Type. B.M.

## Genus 118. ACIPTILUS, Zeller.

*Isis, p. 768* (1841).

## 317. ACIPTILUS FURCATALIS.

*Aciptilus furcatalis*, *Walker, Lep. Het. XXX., p. 950, n. 26* (1864).

New Zealand (*Bolton*); Auckland (*Oxley*). Type. B.M.

## 318. ACIPTILUS MONOSPILALIS.

*Aciptilus monospilalis*, *Walker, Lep. Het. XXX., p. 950, n. 27* (1864).

New Zealand (*Sinclair, Bolton*). Type. B.M.





THE  
ZOOLOGY  
OF THE  
VOYAGE OF H.M.S. EREBUS & TERROR,  
UNDER THE COMMAND OF CAPTAIN SIR JAMES CLARK ROSS, R.N., F.R.S.,  
DURING THE YEARS  
1839 TO 1843.

*BY AUTHORITY OF THE LORDS COMMISSIONERS OF THE ADMIRALTY.*

EDITED BY

JOHN RICHARDSON, M.D., F.R.S., &c.;

AND

JOHN EDWARD GRAY, Esq., Ph.D., F.R.S., &c.

MOLLUSCA.

BY

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LONDON:

E. W. JANSON, 28, MUSEUM STREET, W.C.

M.DCCC.LXXIV.



# MOLLUSCA.

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BY EDGAR A. SMITH, F.Z.S., OF THE ZOOLOGICAL DEPARTMENT, BRITISH MUSEUM.

The four following excellent plates will be very acceptable to Conchologists, as they contain figures of several species (about twenty) which, until the present time, have been known only by descriptions, in some instances very short and insufficient, and also the more interesting as, in thirty-one instances, the actual type specimens are delineated.

Plates 1 to 3 are devoted exclusively to species belonging to the New Zealand fauna. Four of them are new to science, and three, described some years since, are unrecorded in Von Martens' very useful "Critical List of the Mollusca of New Zealand."

Plate 4 includes, with one exception (*Helix Meneana*), figures of some Australian Land and Freshwater Mollusca of which two appear to be as yet undescribed.

All the species with the exception of *Bulinus antipodum* and *Vermectus cariniferus* are in the British Museum, and those preceded by a \* were presented by Sir John Richardson, M.D., F.R.S.

## A. TERRESTRIAL MOLLUSCA.

### Family HELICINIDÆ.

#### \* HELICINA RETICULATA. Tab. 4, f. 12.

*Helicina reticulata*, Pfeiffer, *Proc. Zool. Soc.*, 1862, p. 277.  
Hab. Blackwood Bay. Australia (*Richardson*).

### Family HELICIDÆ.

#### HELIUS BUSBYI. Tab. 1, fig. 4.

*Helix Busbyi*, Gray, *Annals and Mag. Nat. Hist.*, 1841, VI., p. 317.

Hab. New Zealand (*Busby*).

The type example presented to the British Museum by Mr. Dunn is here figured.

#### HELIUS DUNNIE. Tab. 1, fig. 7.

*Helix Dunnie*, Gray, *Annals and Mag. Nat. Hist.*, 1841, VI., p. 317.

Hab. New Zealand.

The specimen here represented, also the gift of Mrs. Dunn to the National Collection, is the type.

#### HELIUS KIVI. Tab. 1, fig. 1.

*Nanina ? kivi*, Gray, *Dieffenbach's N. Z. II.*, p. 262.

Hab. New Zealand (*Dr. Sinclair*).

#### HELIUS MARIE. Tab. 1, fig. 2.

*Nanina Marie*, Gray, *Dieffenbach's N. Z. II.*, p. 262.

Hab. New Zealand (*Dr. Sinclair*).

#### HELIUS COMA. Tab. 1, fig. 3.

*Zonites coma*, Gray, *Dieffenbach's N. Z. II.*, p. 262.

Hab. New Zealand (*Dr. Sinclair*).

\* *HELIX NIGRILABRIS.* *Tab. 4, fig. 16.*

*Helix* (Xanthomelon) *nigrilabris*, *Von Martens, Malak. Blatt.* XVI, p. 78.

H. Edwardsi, *Cox, Monog. Austral. Land Shells*, p. 109, pl. 19, f. 3, 3a.

H. (Galaxias) Meadei, *Brazier, P.Z.S.*, 1870, p. 662.

Hab. Blackwood Bay, N. E. Australia (*Richardson*).

The shell here figured is not a typical example of this species as it lacks the sutural chestnut band, and the thin callous deposit on the body whorl, and the peritreme is of a bright chestnut hue, and only the former part is furnished with granules, which are very small.

*HELIX BIPARTITA.* *Tab. 4, fig. 11.*

*Helix bipartita*, *Férussac, Hist.*, pl. 75, f. 1.

Hab. North East Australia.

\* *HELIX RICHARDSONII*, *sp. n.* *Tab. 4, fig. 14.*

Shell perforated (perforation concealed), globosely depressed, rather thin, finely striated by the lines of growth, whitish, the last whorl encircled with ten to twelve palish-brown lines (sometimes in worn specimens these are diaphanous and colourless) one of them a little above the periphery being broader, and of a deeper colour than the rest; spire moderately raised; whorls  $4\frac{1}{2}$ —5 slowly increasing, the last conspicuously descending near the lip; aperture very oblique, rhomboidal-lunate; peristome white, thin, shortly expanded, at the umbilical region spread over the whorl in the form of a thin callosity concealing the perforation and united to the lip above.

Greatest diameter 19 mill., smallest 16; height 12.

Hab. Dupuch's Is., West Coast of Australia (*Richardson*).

This species is allied to *H. Reinga*, Gray, which is said to come from New Zealand, but I may add that all the specimens in the British Museum, with reliable localities, are from different parts of Australia.

From *H. Reinga*, it differs in being of larger and thinner growth, in the number of the whorls, which are not so convex, being nearly one less, and in having the underside of the last whorl, which is proportionally larger, more flattened, especially at the umbilical region which is over-spread by a broadish thin callosity, united above to the outer lip. The greater deflection of the last whorl near the mouth is another notable difference, and the peritreme is thinner and more expanded.

\* *HELIX VIRGATA.* *Tab. 4, fig. 15.*

*Helix virgata*, *Da Costa, Brit. Conch.*, p. 79, pl. 4, f. 7; *Jeffreys, Brit. Con. I.*, p. 210.

Hab. Poul Point, North West Coast of Australia.

(*Richardson*).

There are two specimens brought from the above locality, which I cannot distinguish in any particular from this species. This is not the first record of its occurrence in Australia, for a sinistral variety is mentioned by Mr.

Gwyn Jeffreys as coming from New South Wales. Its advent there is not to be accounted for with certainty, but possibly it is an introduction of the common European shell, as appears to be the case with *H. nitida*, Müller.

\* *HELIX LEPTOGRAMMA.* *Tab. 4, fig. 18.*

*Helix leptogramma*, *Pfeiffer, Mon. Hel. I.*, p. 322.

Hab. Australia (*Richardson*).

\* *HELIX MENKEANA.* *Tab. 4, fig. 9.*

*Helix Menkeana*, *Pfeiffer, Mon. Hel. I.*, p. 55.

Hab. Cape of Good Hope. (*Kreuss*).

The shell here figured is that variety which is of a pale horn-colour, with only the one broad, superior brown band. It was presented by Dr. Richardson without a locality.

\* *HELIX CYCLOSTOMATA.* *Tab. 4, fig. 13.*

*Helix cyclostomata*, *Le Guillou, Rev. Zool.*, 1842, p. 141.

H. Tuckeri, *Pfr.*, and H. strangulata, *Hombr. & Jacq.*

Hab. Blackwood Bay, Australia (*Richardson*).

*HELIX STRANGEL.* *Tab. 4, fig. 17.*

*Helix Strangel*, *Pfeiffer, Mon. Hel. III.*, p. 98.

Hab. Blackwood Bay, York Isles, near Cape York, N. E. Australia (*Richardson*).

*HELIX MILLESTRIATA, sp. n.* *Tab. 4, fig. 5.*

Shell thin, horn-colour, perspectivevly umbilicated, depressly orbicular, ornamented with very close arcuately-radiating thread-like riblets, which are coarser on the upper than the lower surface, entirely covered with microscopic spiral striations which are continuous on and between the riblets; spire nearly flat, only slightly elevated; whorls five, slowly increasing, rather convex, separated by a deepish suture, last not descending in front; the umbilicus occupying one-fourth the width of the base; mouth roundly-lunate; peristome simple, thin, columellar margin a little dilated above.

Greatest diameter 7 mill., smallest 6; height 3.

Hab. Dupuch's Is., West Australia (*Richardson*).

This small but prettily sculptured species is chiefly characterized by the fine riblets, and the microscopic spiral striations, which are not, as in some other species, interrupted by the riblets, but are continuous over them. The inferior surface is slightly shining, the upper not so.

*VITRINA FREYCINETI.* *Tab. 4, fig. 4.*

*Helixiarion Freycineti*, *Fér. Prodr. II.*, p. 20; *Hist.*, pl. 9a, f. 3, 4; pl. 9b, f. 2.

Hab. New South Wales.



*BULIMUS ANTIPODUM.* *Tab. 1, fig. 5.*

*Bulimus antipodum*, *Gray, Dieffenbach's N. Z. II.*, p. 247.  
*Hab. Kaitia, N. Z. (Dieffenbach).*

This species is here figured for the first time.

\* *BULIMUS PACIFICUS.* *Tab. 4, fig. 6.*

*Bulimus pacificus*, *Pfeiffer, Proc. Zool. Soc. 1846*, p. 31;  
*Mon. Hel. II.*, p. 309.

*Hab. N. W. Australia, Pigeon Is. (Dr. Richardson).*

*PUPA STRANGEL.* *Tab. 4, fig. 8.*

*Pupa Strangeli*, *Pfeiffer, Mon. Hel. III.*, p. 560.  
*Hab. "Sydney."*

The above figure does not represent the armature of the aperture quite accurately.

*PUPA, sp. n.?* *Tab. 4, fig. 7.*

*Hab. Australia.*

This figure appears to represent an undescribed species of *Pupa*; but during the lapse of time, since the plate was executed, the specimen has been unfortunately crushed and cannot therefore be now characterized.

*B. FRESHWATER MOLLUSCA.*

Family *PALUDINIDÆ.*

\* *PALUDINA AUSTRALIS.* *Tab. 4, fig. 19.*

*Paludina australis*, *Reeve, Conch. Icon. XIV.*, f. 71.

*Hab. Australia.* The shell here represented is immature.

*HYDROBIA ANTIPODUM.* *Tab. 1, fig. 19.*

*Amnicola antipodanum*, *Gray, Dieffenbach's N. Z. II.*, p. 241.

*Hab. New Zealand (Dr. Sinclair).* Type figured.

*HYDROBIA ZELANDIÆ.* *Tab. 1, fig. below 19.*

*Amnicola?* *Zelandiæ*, *Gray, Dieffenbach's N. Z. II.*, p. 241.

*Hab. New Zealand (Dr. Stanger).* Type figured.

Family *MELANIIDÆ.*

\* *MELANIA AUSTRALIS.* *Tab. 4, fig. 3.*

*Melania Australis*, *Reeve, Conch. Icon. XII.*, f. 82.  
*Hab. Victoria River (Richardson).*

*MELANOPSIS TRIFASCIATA.* *Pl. 1, figs. 22, 18.*

*Melanopsis trifasciata*, *Gray, Dieffenbach's N. Z. II.*, p. 263.

*M. Zelandica*, *Gould 1848*; *M. Strangeli*, *Reeve 1860*;  
*M. ovata*, *Dunker 1861.*

*Hab. Waitanga Falls, Bay of Islands, N. Zealand.*

The actual type is represented by fig. 22, fig. 18 representing a very large old specimen with the spire decollated as frequently is the case in this species.

Family *UNIONIDÆ.*

\* *UNIO MORETONICUS.* *Tab. 4, fig. 2.*

*Unio moretonicus*, *Reeve, Conch. Icon. XVI.*, f. 118.

*U. Australis*, *Lamarck? Anim. s. Vert. ed. 2, VI.*, p. 546.

*Hab. Australia (Membridge River). (Richardson).*

*MYCETOPUS RUGATUS.* *Tab. 4, fig. 1.*

*Mycetopus rugatus*, *Sowerby, Conch. Icon. XVII.*, f. 7.

*Hab. Victoria River, N. Australia.*

Possibly when the animal inhabiting this shell is examined it will prove to be an *Anodonta*. The shell scarcely gapes at the anterior extremity.

*C. MARINE MOLLUSCA.*

Family *CERITHIIDÆ.*

*CERITHIDEA BICARINATA.* *Tab. 1, fig. 20.*

*Cerithium bicarinata*, *Gray, Dieffenbach's N. Z. II.*, p. 241.  
*Hab. New Zealand (Dr. Stanger).* Type figured.

Family *TRICHOSTROPHIDÆ.*

*TRICHOSTROPIS CLATHRATA (A. Adams Ms.)* *Tab. 1, fig. 21.*

*Hab. New Zealand (Dr. Sinclair, Colonel Bolton, and Dr. Lyall, R.N.)*

The above name is attached to a specimen in the Cummingian collection, without any locality, which agrees in every particular with specimens from New Zealand collected by the gentleman quoted above. The name occurs in Messrs. Adams' list in the "Genera of recent Mollusca" vol. I., p. 280; but as I cannot find a description of any species so designated, I append the following:—

Shell shortly fusiform, turreted, very narrowly umbilicated, of a pale pinkish, or dirty white colour; whorls six, two first convex, smooth, shining, the rest convex, but slightly angulated near the middle, ornamented with a fine cancellation formed by rather oblique longitudinal fine ribs (about twenty in a whorl) being cut across by spiral lirations (six in the upper whorls, and about twelve in the last) the fourth from the top being a little larger than the rest, and producing the faint angulation near the middle of the whorls; aperture subcircular, obliquely but shallowly channelled at the base, occupying about half the length of the entire shell; labrum very slightly expanded; columella arcuate above, angulated just below the middle by an acute projection and oblique inferiorly, covered by a thin

callosity which is united to the labrum above and being slightly expanded almost conceals the umbilical fissure.

Length, 7 lines, breadth  $3\frac{1}{2}$ , a smaller specimen is  $4\frac{1}{2}$  lines long and  $2\frac{1}{2}$  broad.

The spiral lirations are rather more prominent than the longitudinal ribs, and the three on the superior half of the whorls are finer than those on the lower portion. The points of intersection are faintly nodulous.

The figure representing this species is not characteristic, for it is taken from a young example, and the form of the mouth is very different from that of the adult shell.

#### Family VERMETIDÆ.

##### VERMETUS CARINIFERUS. *Tab. 1, fig. 23.*

*Vermetus cariniferus*, Gray, in *Dieff. N. Z. II.*, p. 242.

Hab. Parengarenga, N. Cape, N. Zealand (*Dieffenbach*).

Type figured.

#### Family TROCHIDÆ.

##### TROCHUS (ANTHORA) TUBERCULATUS. *Tab. 1, fig. 6.*

*Polydonta tuberculata*, Gray, in *Dieffenbach's N. Z.*, p. 239.

Hab. New Zealand (*Dieffenbach*). Type figured

##### TROCHUS (GIBBULA) SANGUINEUS. *Tab. 1, fig. 12.*

*Trochus Gibbium sanguineus*, Gray, in *Dieffenbach's N. Z. II.*, p. 238.

Hab. New Zealand (*Dr. Stanger*). Type figured.

##### TROCHUS (LABIO) SUBROSTRATUS. *Tab. 1, fig. 14.*

*Monodonta subrostrata*, Gray in *Dieff. N. Z. II.*, p. 238; *Fate's N. Z.*, p. 308.

Hab. New Zealand (*Dieffenbach*).

##### TROCHUS (CHLOROSTOMA) UNDULOSUS. *Tab. 1, fig. 15.*

*Chlorostoma undulosum*, A. Adams, *Proc. Zool. Soc.*, 1851, p. 182.

Hab. New Zealand (*Eart*).

Mr. A. Adams describes the colour of this species which appears to have been overlooked by Von Martens in his list of New Zealand Shells as "virescenti." All three specimens in the Cunningham collection are yellowish (luteus). He writes "labro intus sulcato," which refers to the three or four shallow sulcations placed far within the aperture. The dimensions of this species are as follows: greatest height 16 mill; diam. 19.

#### Family HALIOTIDÆ.

##### HALIOTIS GIBBA. *Tab. 1, fig. 16.*

*Haliotis gibba* (*Philippi*?) *Reeve, Conch. Icon. III.*, f. 42. Hab. N. Zealand.

#### Family PATELLIDÆ.

##### PATELLA REDIMICULUM. *Tab. 1, fig. 24.*

*Patella redimiculum*, *Reeve, Conch. Icon. VIII.*, f. 25a-b and 50a-b.

Hab. New Zealand. Distinct from *P. radians*, Gmelin.

##### PATELLA DENTICULATA. *Tab. 1, fig. 24.*

*Patella denticulata*, *Martyn, Univ. Conch.*, II., pl. 65.

*Patella margaritaria*, *Chemnitz*.

Hab. New Zealand.

##### PATELLA ANTIPODUM, *sp. n.* *Tab. 1, fig. 25.*

Shell rotundately ovate, a little narrowed in front, the apex much inclined anteriorly, placed at a distance of one-fourth of the entire length from the front margin, radiately rather finely ribbed, ribs crossed by the fine concentric lines of growth, orange-yellow clouded with white around the middle, varied with ten or eleven black narrow rays placed at nearly equal distances, those in front being rather more approximated than the rest; the interior is brilliant pearly orange-yellow, the exterior black rays being visible especially at the margin which is finely crenulated.

Length 28 mill.; width 22; height 9.

Hab. New Zealand. (Presented by *Lieut.-Col. Bolton, R.E.*)

The figure of this species represents the apex decidedly too central. When resting on a flat surface the anterior and posterior margins only are in contact with it.

#### Family CHITONIDÆ.

##### CHITON (LEPTOCHITON) ÆREUS. *Tab. 1, fig. 9.*

*Chiton æreus*, *Reeve, Conch. Icon. IV.*, f. 36.

Hab. New Zealand. Type in Museum collection.

##### CHITON (LEPTOCHITON) SINCLAIRI. *Tab. 1, fig. 17.*

*Chiton Sinclairi*, Gray in *Dieffenbach's N. Z. II.*, p. 263.

Hab. Great Barrier Is., N. Zealand. The type is figured.

##### CHITON (CHÆTOPLEURA) NOBILIS. *Tab. 1, fig. 8.*

*Acanthopleura nobilis*, Gray in *Dieffenbach's N. Z. II.*, p. 245.

Hab. New Zealand.

##### CHITON (PLAXIPHORA) TERMINALIS. *Tab. 1, fig. 13.*

*Placiphora terminalis*, *Cyr. MS.* (in Coll. *Cuming*.)

Shell elongately ovate, rather elevated, rounded angled along the top of the valves, black or bluish-black, with a white wedge-shaped stripe with a black one within it down the centre of the valves, forming a continuous white stripe divided by the black one along the centre of

the shell, in some specimens with a few short white dashes diverging from the radiating ridges. The intermediate valves mucronated, bisected on each side by one raised radiating rib, the posterior margins sinuated and thickened by coarse concentric lamellæ: the entire surface is covered with minute striate-wrinkling, those near the ridge being coarser than the rest and radiating from it like the webs from the shaft of a feather. The posterior terminal valve has the mucro quite terminal. The anterior valve radiately eight-ribbed (at times one or two additional minor ones are present) with diverging oblique striations on each side of them. Interior of valves greenish-blue; valve lobes whitish, the sinus between them deep; the hairs or bristles on the mantle-margin are short, few and horny, those arising from the nine pores being thicker than the rest.

Largest specimen (in a contracted state) 42 mill. long; width of valves, 20.

An average specimen. Length, 25 mill.; width, 11.

Hab. New Zealand (*Col. Bolton and Capt. Stokes*).

"*Terminialis*" appears to be but a manuscript name attached to some specimens in the Cunningham collection. As I understand that Dr. P. P. Carpenter is engaged on a work on *Chitonidae* I retain the characteristic name he imposes.

The central white stripe with the black one within it appears to be very constant.

#### Family BULLIDÆ.

##### BULLA QUOYII. *Tab. 1, fig. 11.*

Bulla Quoynii, *Gray, in Dieffenbach's N. Z. II., p. 243.*

Hab. New Zealand (*Dr. Stanger*). Type figured.

##### HAMINEA ZELANDIÆ. *Tab. 1, fig. 10.*

Bulla Zelandiæ, *Gray, in Dieffenbach's N. Z. II., p. 243.*

Haminea obesa, *Sowerby, Conch. Icon. XVI., f. 13.*

Hab. New Zealand (*Dr. Dieffenbach*). Type figured.

This species is certainly distinct from *H. penzance*, Philippi, of which it is considered a synonym by A. Adams, *Thesaurus Conch. II., p. 580*. See *Annals and Mag. Nat. Hist.*, 1872, IX., p. 347.

#### Family PHOLIDIDÆ.

##### PHOLIDIDÆA TRIDENS. *Tab. 2, fig. 8.*

Talona tridens, *Gray in Dieffenbach's N. Z. II., p. 254.*

Hab. New Zealand (*Dr. Stanger*). Type figured.

#### Family TELLINIDÆ.

##### SOLETELLINA NITIDA. *Tab. 2, fig. 9.*

Psammobia nitida, *Gray in Dieffenbach's N. Z. II., p. 253.*

Hab. New Zealand (*Dr. Stanger*).

##### PSAMMOBIA LINEOLATA. *Tab. 2, fig. 11.*

Psammobia lineolata, *Gray in Dieffenbach's N. Z. II., p. 253.*

Hab. New Zealand.

##### TELLINA GLABRELLA. *Tab. 2, fig. 7.*

Tellina glabrella, *Deshayes, Proc. Zool. Soc., 1854, p. 366.*

Hab. New Zealand. Type in Brit. Mus.

#### Family MACTRIDÆ.

##### MACTRA DISCOIRS. *Tab. 2, fig. 4.*

Maetra discors, *Gray, Annals and Mag. Nat. Hist. I., 1837, p. 371.*

Hab. New Zealand.

The above figure is taken from a very young specimen.

##### MACTRA (SPISULA) AQUILATERALIS. *Tab. 2, fig. 10.*

Maetra aquilateralis, *Deshayes, Proc. Zool. Soc., 1853, p. 17.*

*M. aquilatera*, *Reeve, Conch. Icon. VIII., f. 14; Von Martens, List New Zealand Mollusca, p. 44.*

Hab. New Zealand. Type in Brit. Mus.

##### MACTRA (STANDELLA) OVATA. *Tab. 2, fig. 2.*

Spisula ovata, *Gray, Dieffenbach's N. Z. II., p. 251.*

Hab. West Coast of the North Is., New Zealand (*Dieffenbach*). The type is figured.

##### VANGANELLA TAYLORII. *Tab. 2, fig. 5.*

Vanganella Taylorii, *Gray, Proc. Zool. Soc., 1851, p. 125; Ann. and Mag. N. H. 1853, XI., p. 476.*

*Iresania lanceolata*, *Gray, Ann. and Mag. Nat. Hist., 1853, XI., p. 43.*

*Lutraria lanceolata*, *Reeve, Conch. Icon. VIII., f. 17.*

Hab. New Zealand (*Rev. R. Taylor*).

The type specimens presented by the Rev. R. Taylor to the British Museum are not adult, but the one figured is full-grown.

##### TARIA VENTRICOSA. *Tab. 3, fig. 6.*

Mesodesma ventricosa, *Gray, Dieffenbach's N. Z. II., p. 252.*

Hab. New Zealand.

This species must not be confounded with *T. lata*, Deshayes, which is distinguished at once by the sinus in the pallial line being rather shallow in comparison with that in *ventricosa*, which is considerably deeper, and the latter shell is more inequilateral, and has two obsolete keels (in the figure only one is shown) radiating from the umbones to the margin down the anterior end of the valves, whereas in *lata* there is but a single obsolete angulation.

## Family VENERIDÆ.

DOSINIA SUBROSEA. *Tab. 3, fig. 1.*

*Arthemis subrosea*, Gray, *App. Yate's N. Z.*, p. 309.

Hab. New Zealand (*Yate*).

The type presented to the National collection by the Church Missionary Society is here figured.

VENUS OBLONGA. *Tab. 2, fig. 1.*

*Dosinia oblonga*, Gray, *Dieffenbach's N. Z. II.*, p. 249 (1842).

*Venus oblonga*, Hanley, *Suppl. Index Test.*, pl. 16, f. 1.

*var.* *Dosinia Zelandica*, Gray, pl. 3, f. 5, *App. Yate's N. Z.*, p. 309.

Hab. New Zealand.

The latter variety, the type of which is in the British Museum, presented by the Church Missionary Society, differs from the usual form only in being of a more rounded shape. Although *Zelandica* was described seven years previous to *oblonga* it is advisable to retain the latter name because the shells to which it is applied are of the common form of the species, and also because the former name has been used already by Quoy and Gaimard for another species, and although this is a synonym of *Venus Stutchburii*, Gray, nevertheless for the foregoing reasons it certainly is preferable to retain the name *oblonga*.

VENUS (CHIONE) YATEI. *Tab. 3, fig. 11.*

*Venus Yatei*, Gray, *Yate's N. Z.*, p. 309.

Hab. New Zealand (*Yate*).

The type presented by the Church Missionary Society to the National Museum is figured.

VENUS (CHIONE) STUTCHBURI. *Tab. 3, fig. 4.*

*Venus Stutchburii*, Gray, *Wood's Index Test. Suppl. pl. 2, f. 4.*

Hab. New Zealand.

VENERUPIS REFLEXA. *Tab. 2, fig. 3.*

*Venerupis reflexa*, Gray, *Dieffenbach's N. Z. II.*, p. 250.

*V. paupercula*, Doherty, *Proc. Zool. Soc.* 1853, p. 5.

Hab. New Zealand (*Dieffenbach*).

Type figured.

As surmised by Von Martens, *List Mollusca New Zealand*, p. 46, there can be no doubt of the identity of the above two species, for on comparing the actual types, both of which are in the Museum collection, not the slightest difference is traceable. Fig. 3 on pl. 3 appears to represent a species of this genus intermediate between *reflexa* and *V. Siligui*, Desh., which differs chiefly from the former in being of a more elongated form.

VENERUPIS ELEGANS. *Tab. 2, fig. 6.*

*Venerupis elegans*, Desh., *Proc. Zool. Soc.*, 1853, p. 5, pl. 18, f. 2.

Hab. New Zealand.

Type in Brit. Mus.

## Family UNGULINIDÆ.

DIPLODONTA ZELANDICA. *Tab. 3, fig. 8.*

*Lucina Zelandica*, Gray, *App. Yate's N. Z.*, p. 309.

Hab. New Zealand. Presented by the Church Missionary Society. Type figured.

## Family MYTILIDÆ.

LITHODOMUS TRUNCATUS. *Tab. 2, fig. 12.*

*Lithodomus truncatus*, Gray, *Dieffenbach's N. Z.*, p. 259.

Hab. New Zealand (*Dr. Stanger*). \* Type figured.

## Family NUCULIDÆ.

NUCULA STRANGEL. *Tab. 2, fig. 14.*

*Nucula Strangei*, A. Adams, *Proc. Zool. Soc.*, 1856, p. 52.

Hab. New Zealand.

## Family LEDIDÆ.

NEILO AUSTRALIS. *Tab. 2, fig. 13.*

*Nucula Australis*, Q. and G. Voy. *Astrolabe*, pl. 78, f. 5-10.

Hab. New Zealand.

## Family SOLEMYIDÆ.

SOLEMYA PARKINSONII (Gray Ms.) *Tab. 3, fig. 1.*

Hab. New Zealand (*Col. Bolton, Capt. Stokes, Dieffenbach, Stanger*).

The above appears to be but a manuscript name attached to specimens in the British Museum and Cumingian collections, and I retain it as certain characters observable in the New Zealand shells may be sufficient to distinguish them from those occurring in South Australia (*S. Australis*, Lamarck).

The form of the two species is very similar and the character of the epidermis alike, except that that of *Parkinsonii* is rather darker and sometimes marked with interrupted rays of black. But the chief differences are to be observed within.

In *S. Australis* there exists in each valve a single cardinal tooth, or better callosity, broad and spreading at the dorsal margin of the valve and gradually thinning as it extends arcuately into it; behind this callosity towards the anterior end or longer portion of the shell there is a thin rather broadish lobe-like expansion of the ligament placed in a corresponding shallow depression.

The posterior muscular scar is roundly pear-shaped.

In *S. Parkinsonii* the dental callosity is moderately broad and produced acutely towards the shorter or posterior side of the valve and not truncated as in *Australis*, the exten-

sion of it within the valve is thin nearly separated from it at the base by a depression; the transverse expansion of the ligament is elongate and narrow; the posterior muscular scar is narrower than in the Australian species.

These differences are quite constant in the twenty examples of *Parkinsonii* and four of *Australis* which have been examined.

#### Family PECTINIDÆ.

##### PECTEN ZELANDICÆ. *Tab. 3, fig. 7.*

Pecten Zelandicæ, *Gray, Dieffenbach's New Zeal.*, p. 260.

P. Zelandicus, (*Gray*) *Von Martens, List Moll. New Zeal.*, p. 50.

Hab. New Zealand (*Dr. Stanger*).

Type figured.

#### Family OSTREIDÆ.

##### OSTREA DISCOIDEA. *Tab. 2, fig. 15.*

Ostrea discoidea, *Gould? Proc. Boston Soc. N. H.* 111., p. 347.

Hab. New Zealand.

The above figure is referred to this species with considerable hesitation and doubt.

#### Family ANOMIDÆ.

##### ANOMIA (PLACUNANOMIA) ZELANDICA. *Tab. 3, fig. 10.*

Anomia Zelandica, *Gray, Dieffenbach's N. Z. II.*, p. 260.

Hab. New Zealand (*Dr. Stanger*).

Type figured.

The figure below fig. 9 represents the scar of the plug in the lower valve.

I am unable to refer fig. 9 to this or any other species.

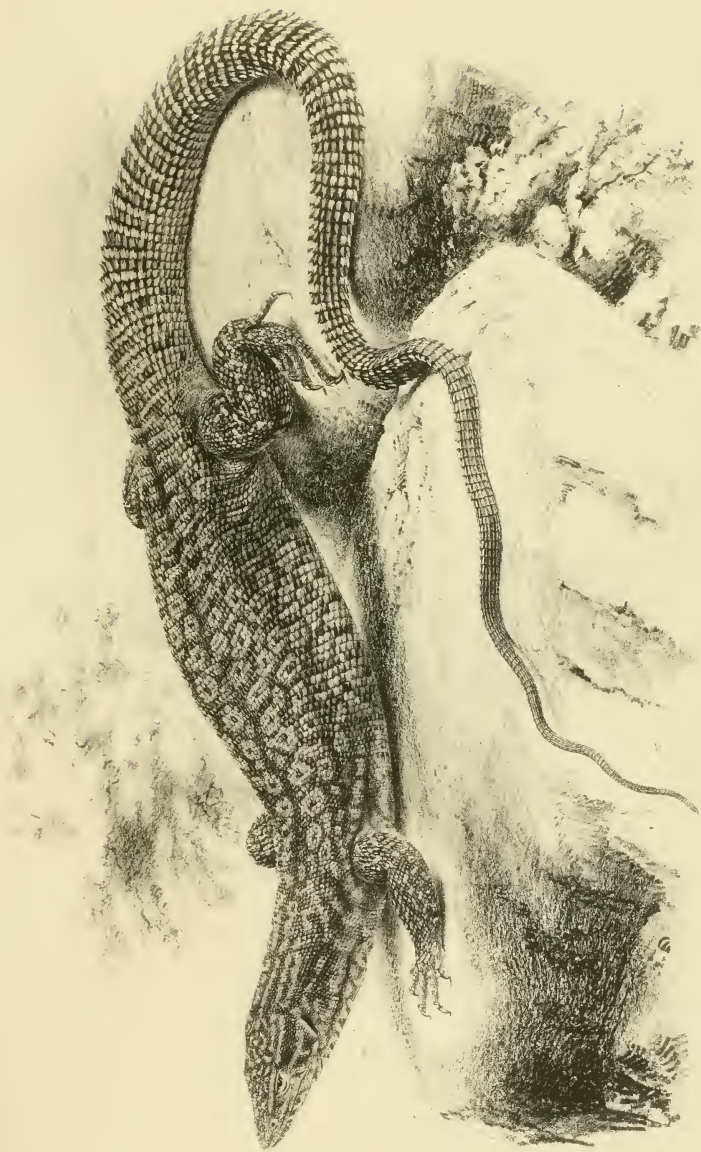






ODATIA PUNCTATA





ODATRIA OCELLATA







MONITOR GOLEDDI



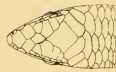


HYDROSAURUS GIGANTEUS





1.



3.

2.



4.



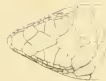
5.











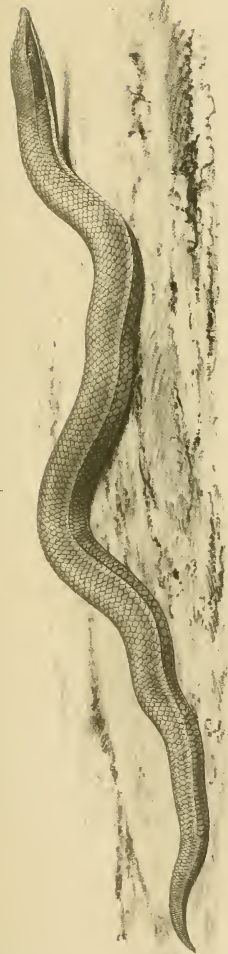
1. CARLIA MELANOCEPHALA.  
4. MOCOA ZELANDICA.

2. MOCOA OCCELLATA.

3. MOCOA MICROTIS.  
5. ENTRECASPERMAEUS.







1 LIALIS PUNCTULATA 2 LIALIS BURTONI 3 PHYGOPUS SQUAMICEPS





*Hinnulia gerrardii*

HINNULIA GERRARDII

*Hinnulia gerrardii* (Gerrard)





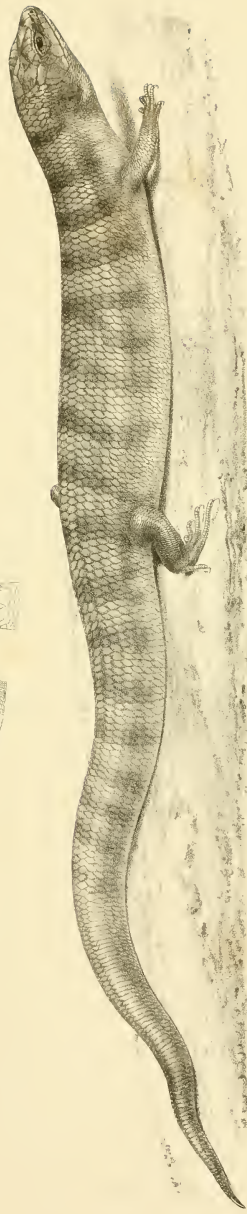
1. *HINULIA ELEGANS.*

2. *HINULIA INORNATA.*

3. *HINULIA GREYII.*







1. HINULIA ORNATA.

2. HINULIA RICHARDSONI.

3. HINULIA TENUIS.





TROPIDOLEPISMA NITIDA

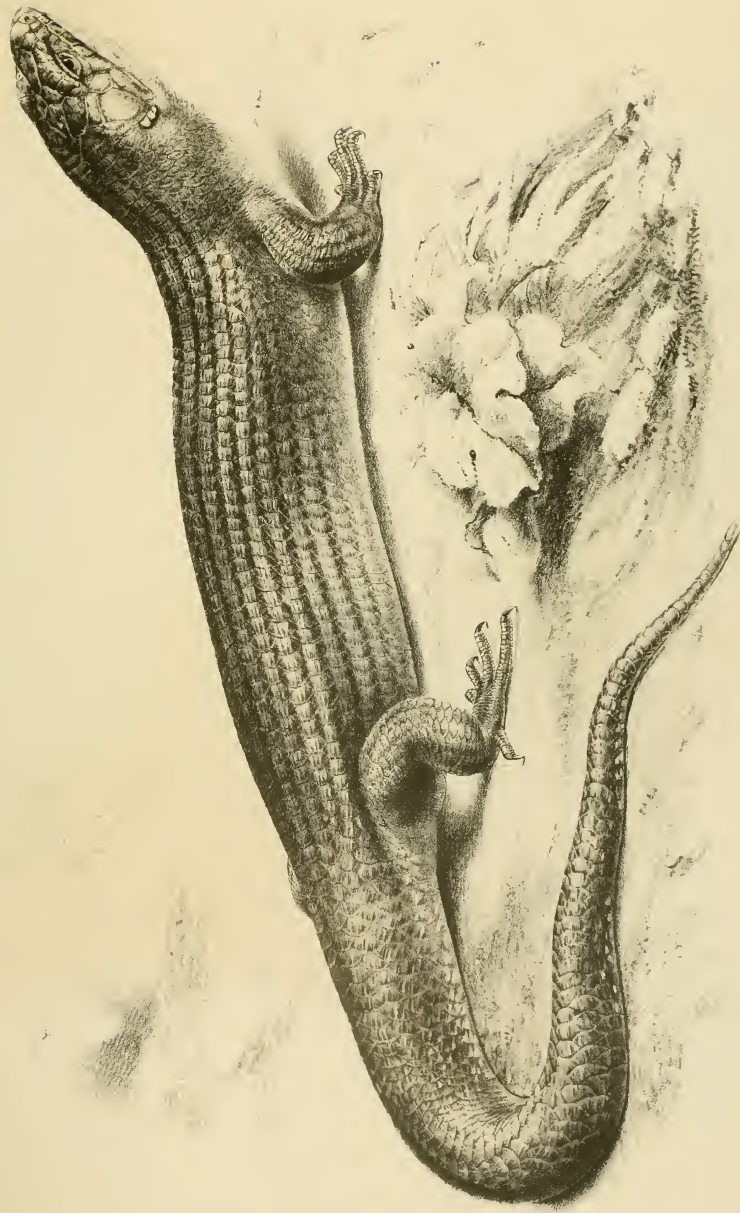






TROPIDOLEPISMA KINGII





TROPIDOLEPISMA MAJOR





2. HEMIDACTYLUS BROOKII.  
5. " VITTATUS.

1. HEMIDACTYLUS DEPRESSUS.  
4. DIPLODACTYLUS OCELLATUS.

3. DIPLODACTYLUS BILINEATUS, ENLARGED.  
6. " MARMORATUS.





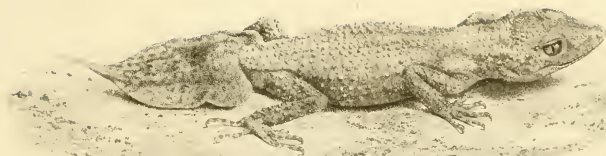


2. DIPLODACTYLUS ORNATUS.  
5. STROPHURA SPINIGERA.

1. EDURA MARMORATA, JUN.?  
4. " MARMORATA.

3. DIPLODACTYLUS VITTATUS.  
6. EDURA RHOMBIFERA.



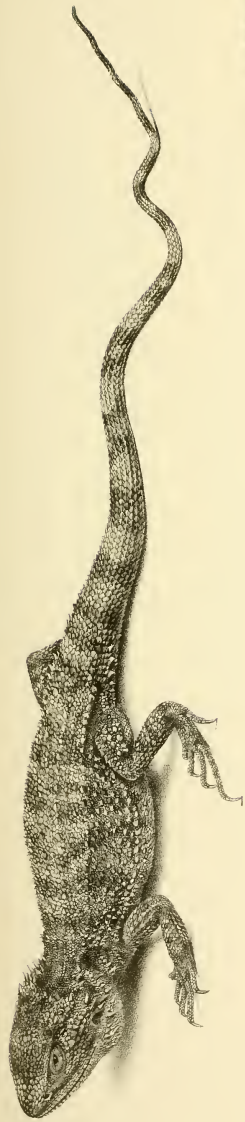


HOLLANDER DEL. T. FOR. LITHO.

1. PHYLLURUS INERMIS  
2. " MYLIUSH  
3. " PLATURUS.







1. GRAMMATOPHORA BARCATA, J. E.  
ADELAIDENSIS.

3. GRAMMATOPHORA ANGULIFERA,  
ORNATA.





1. DIPOROPHORA BILINEATA.

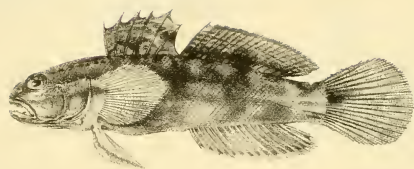
2. LOPHOGNATHUS GILBERTII.



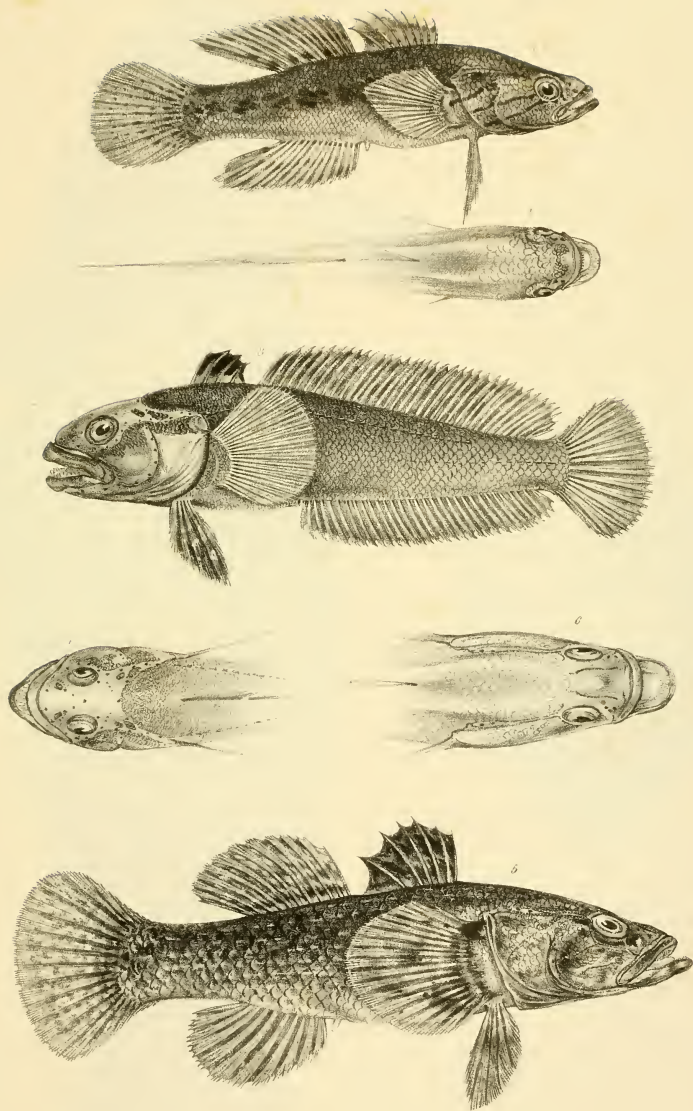












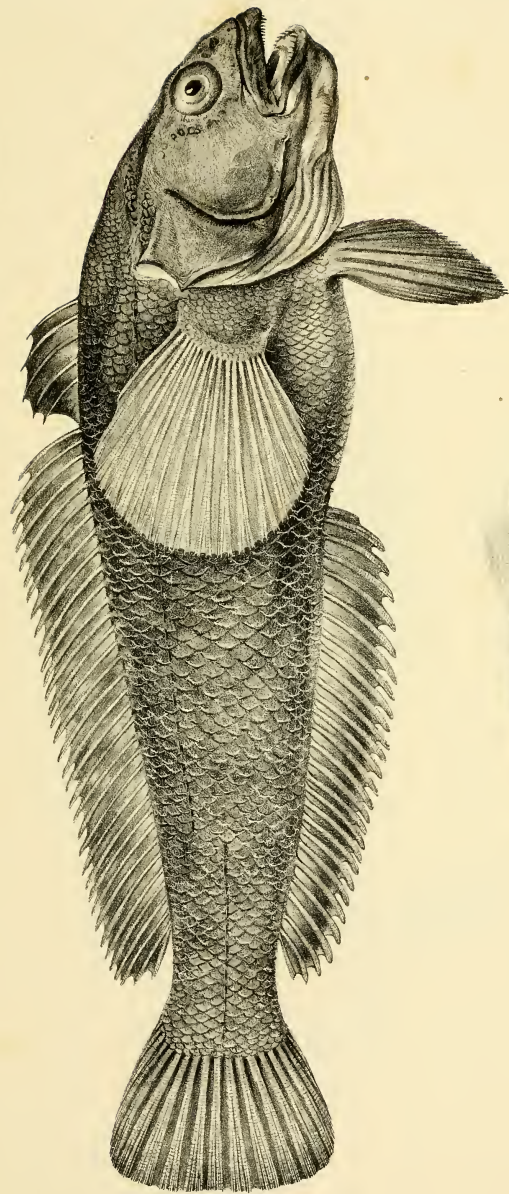
• Drawn on Stone by W. Mitchell

Printed by CH. Hallman & Co.

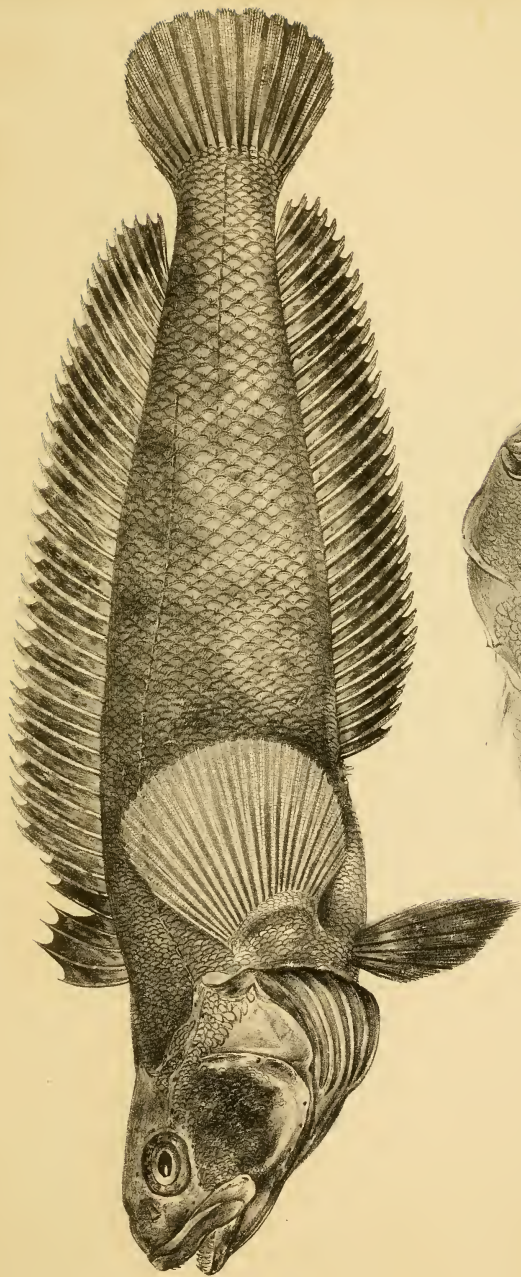
Fig. 1. 2. *ELECTRIS MOGURNDA*. Fig. 3. 4. *NOTOTHEMIA PURPURICEPS*. Fig. 5. 6. *ELECTRIS GOBIOIDES*













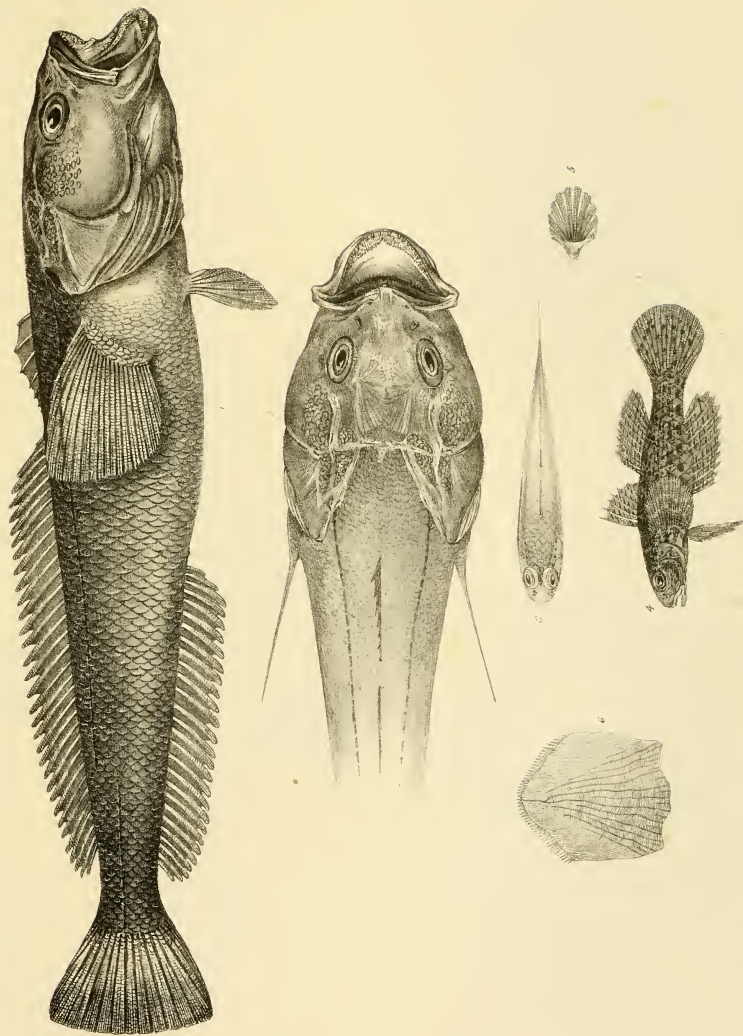


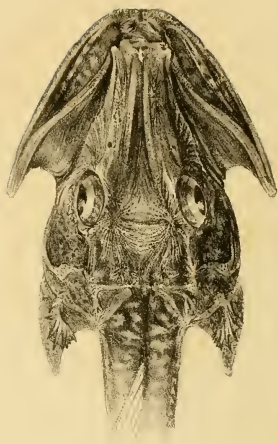
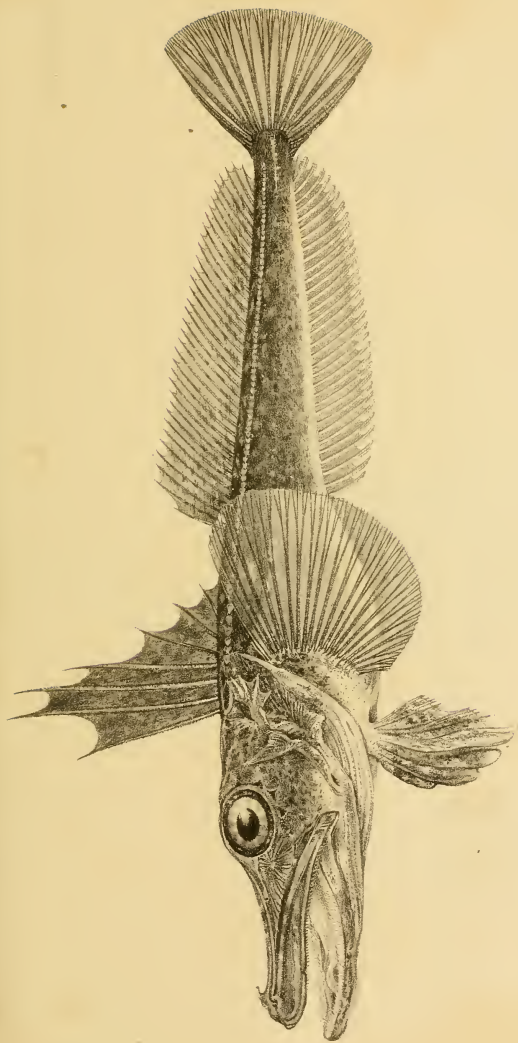
FIG. 1. 2. NOTOTHENIA ROSSII. FIG. 3. 4. 5. MORPHOLOGY INTERSTINCTUS.

Drawn on Stone by W. Mitchell.

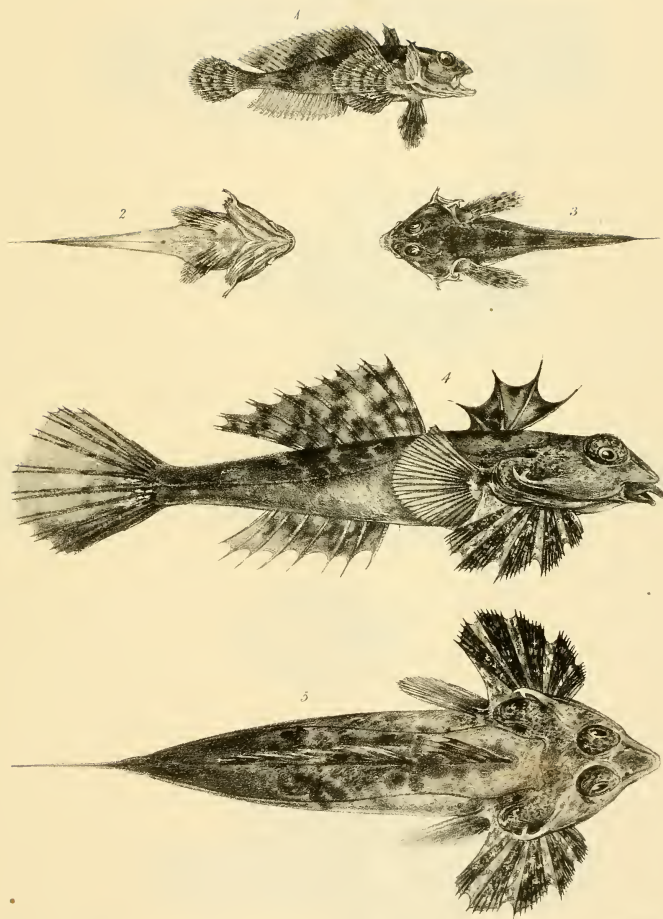
Engraved by H. M. M. & W. L. M.





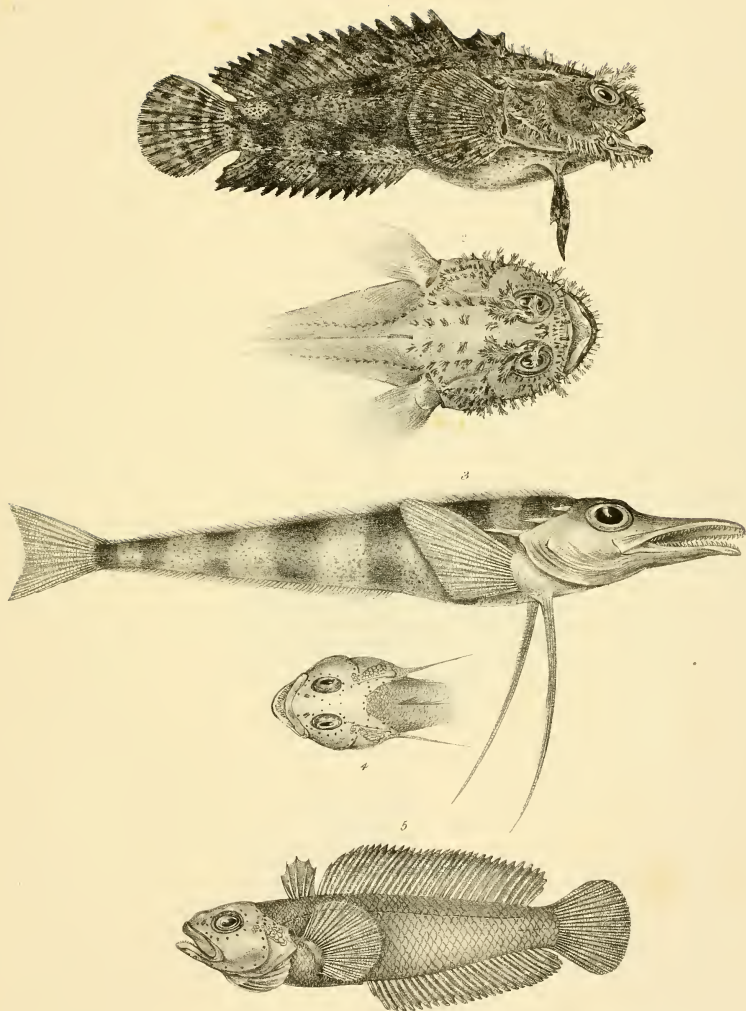










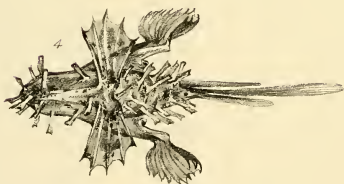
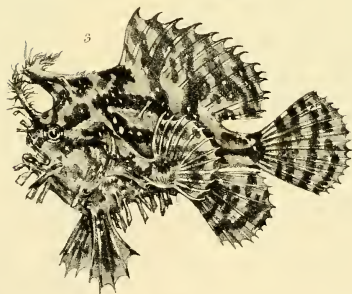
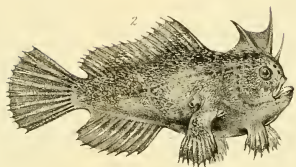
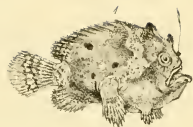


Drawn on Stone by W. Mitchell

Printed by Hallman & Watson

Fig 1 2 BATRACHOPUS DIEMENSIS Fig 3 FACETODES Fig 4 5 NOTOTHENIA CORNUCOLA



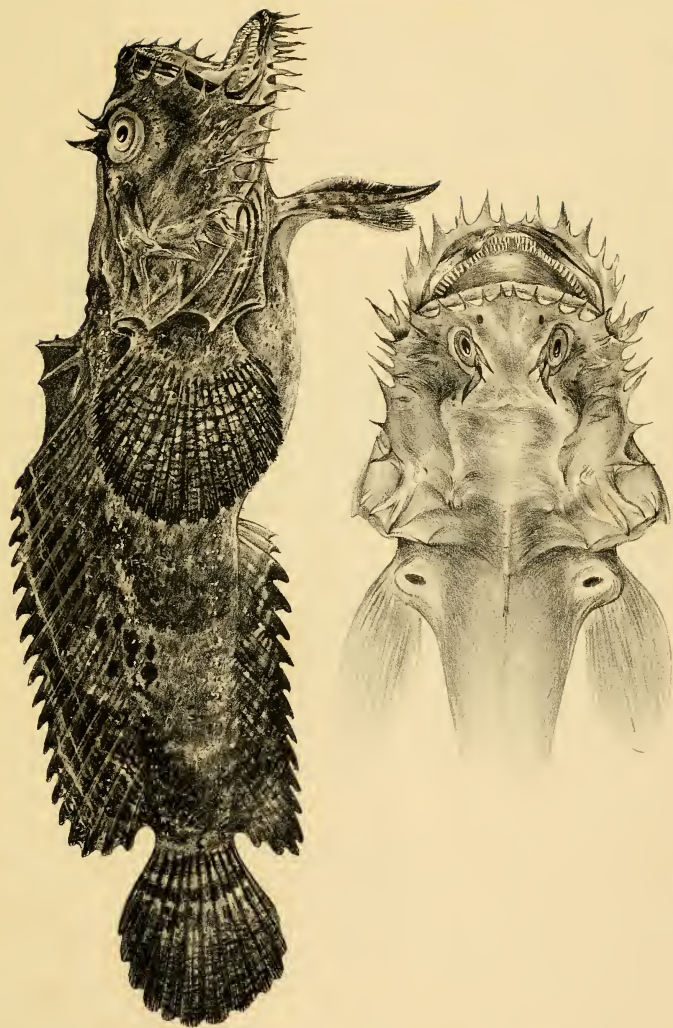


Drawn on Stone by W. Mitchell.

Printed by Ballmaul & Walter.

Fig 1 CHEIRONECTES IMSIGNATUS Fig 2 CH. POLITUS Fig 3 4 CH. VITTATUS





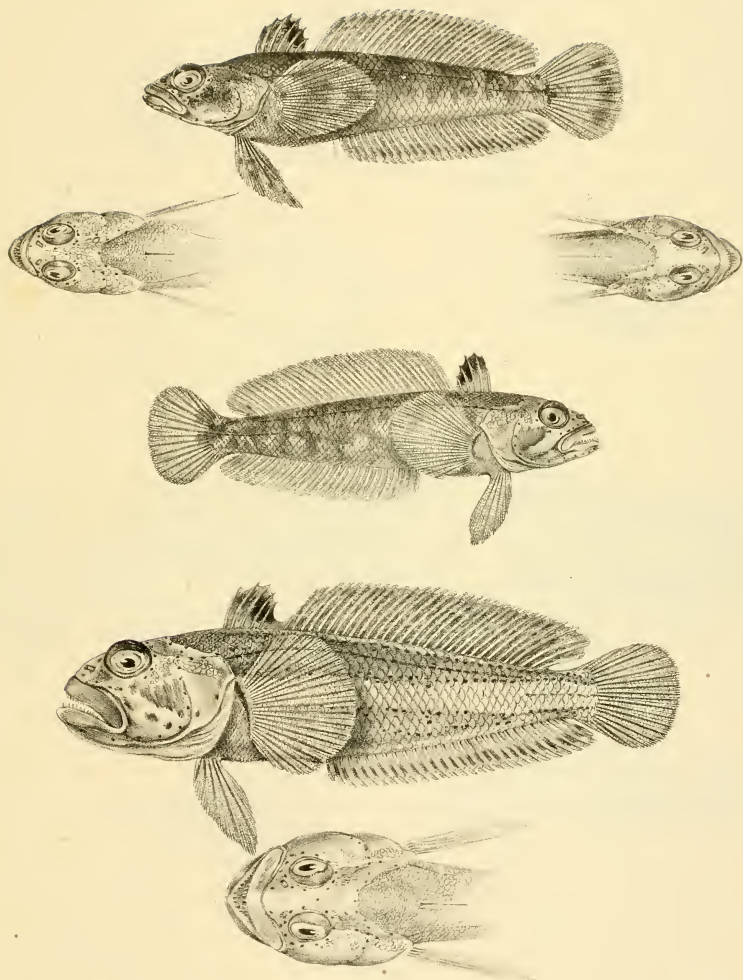
Platichthys fimbriatus (L.)

Drawn by W. M. Smith

PLATICTHYS FIMBRIATUS





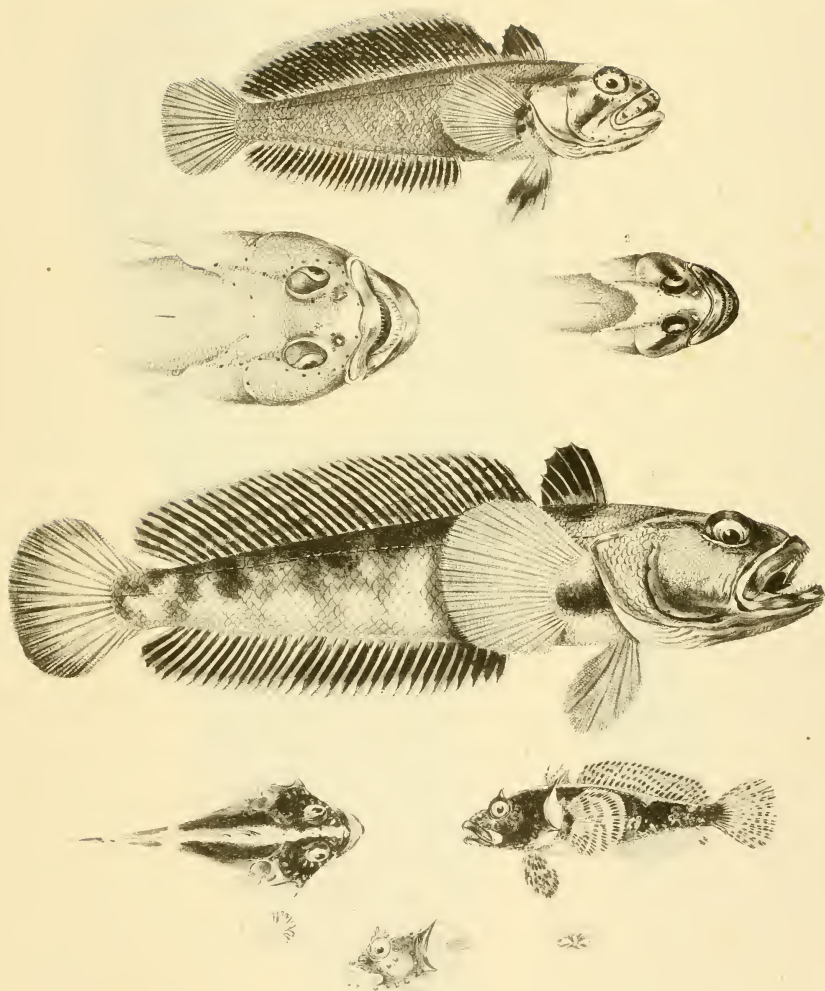


Drawn and Engraved by W. Munkel

Hallman & Walter Lithographers

FIG. 1.3. NOTOTHENIA LIMA 3.4. NOTOTHENIA CORNUCOLA 3.6. NOTOTHENIA VIRGATA





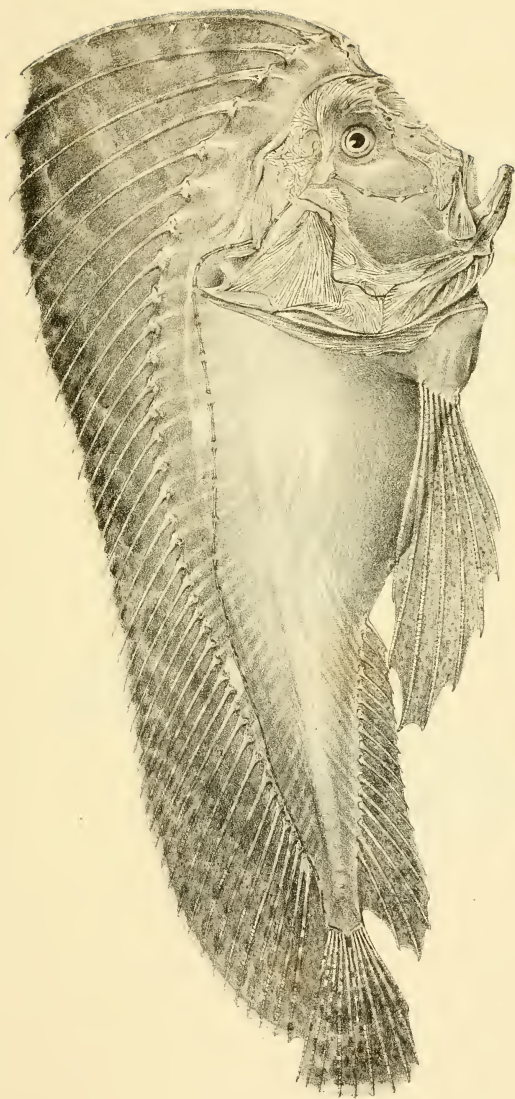
Drawn on Stone by W. Vachell

Engraved by S. Walpole

Fig 1. *NOTOTEPHIA MARGINATA* 2. *NOTOTEPHIA TESSELLATA*  
3. *HARPAGIFER PATULA* 4. *HARPAGIFER BISPINUS*





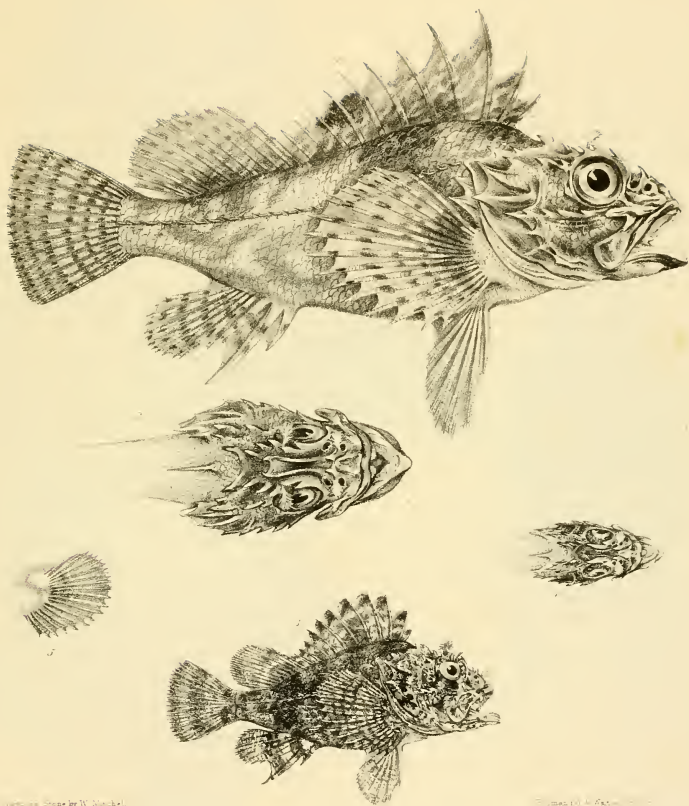


Illustrated from a specimen in the collection of the British Museum

Drawn by H. J. Whitley

PARIENTIS FRONTIS

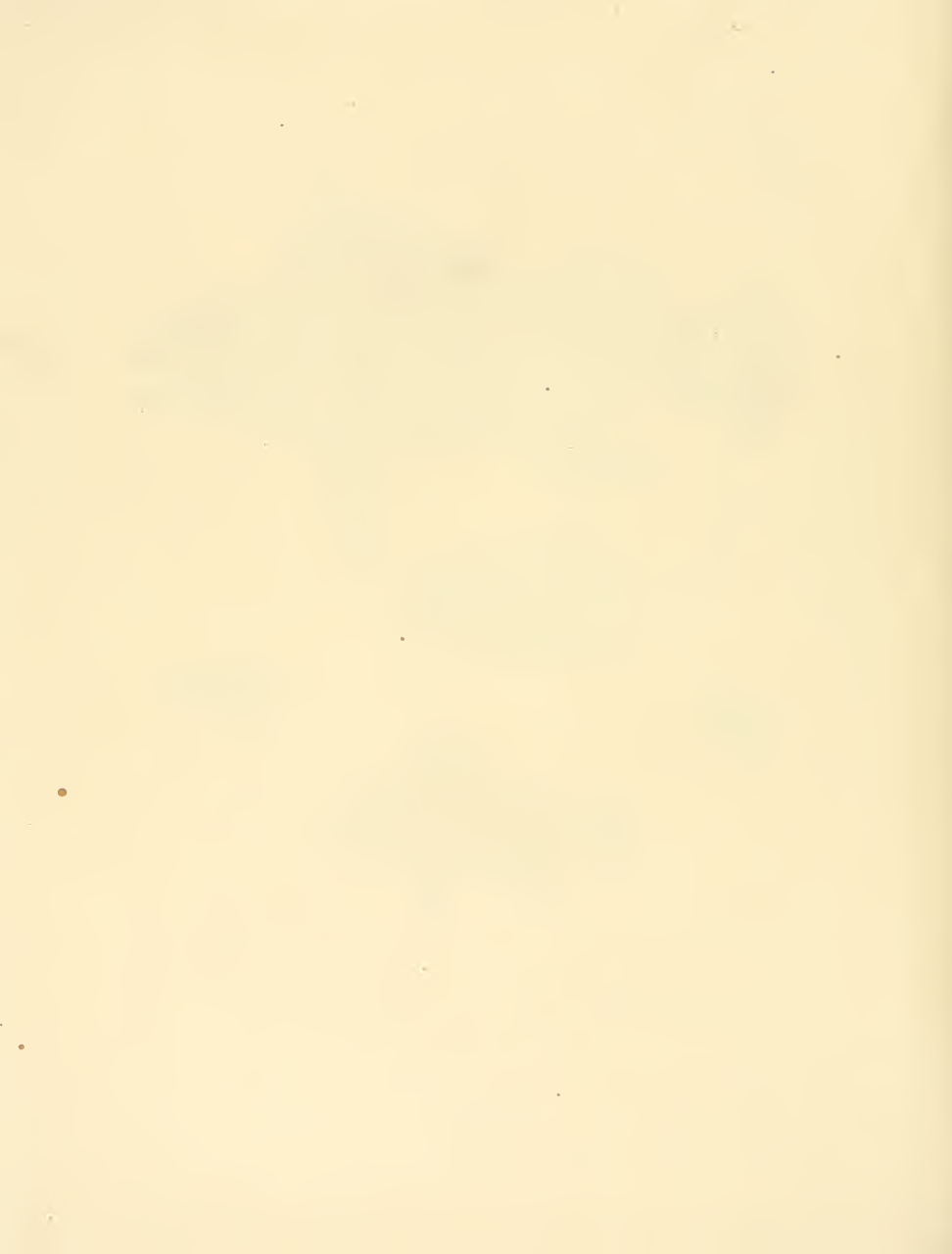


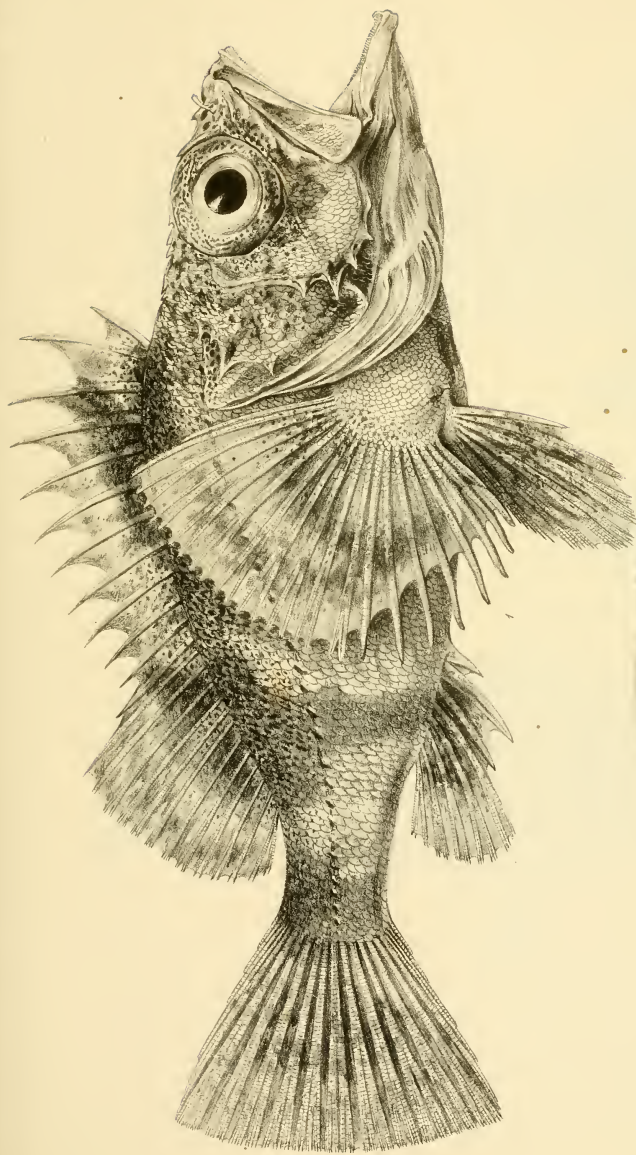


Scorpena militaris by W. Wood.

Scorpena militaris by W. Wood.

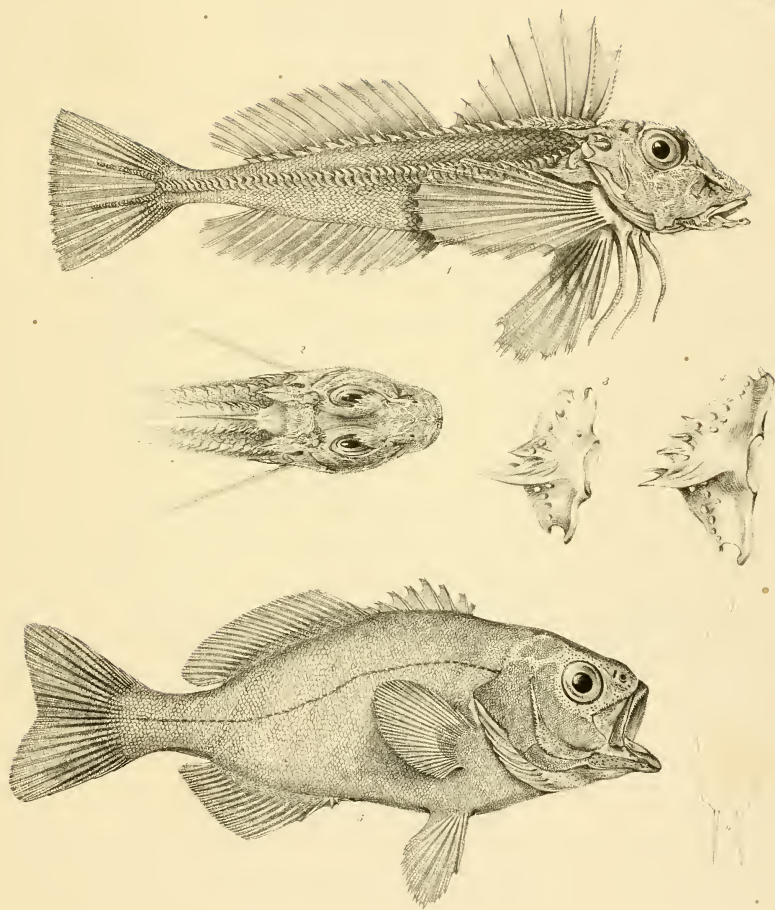
FIG. 1. SCORPENA MILITARIS. FIG. 2. SCORPENA MILITARIS. FIG. 3. SCORPENA MILITARIS.









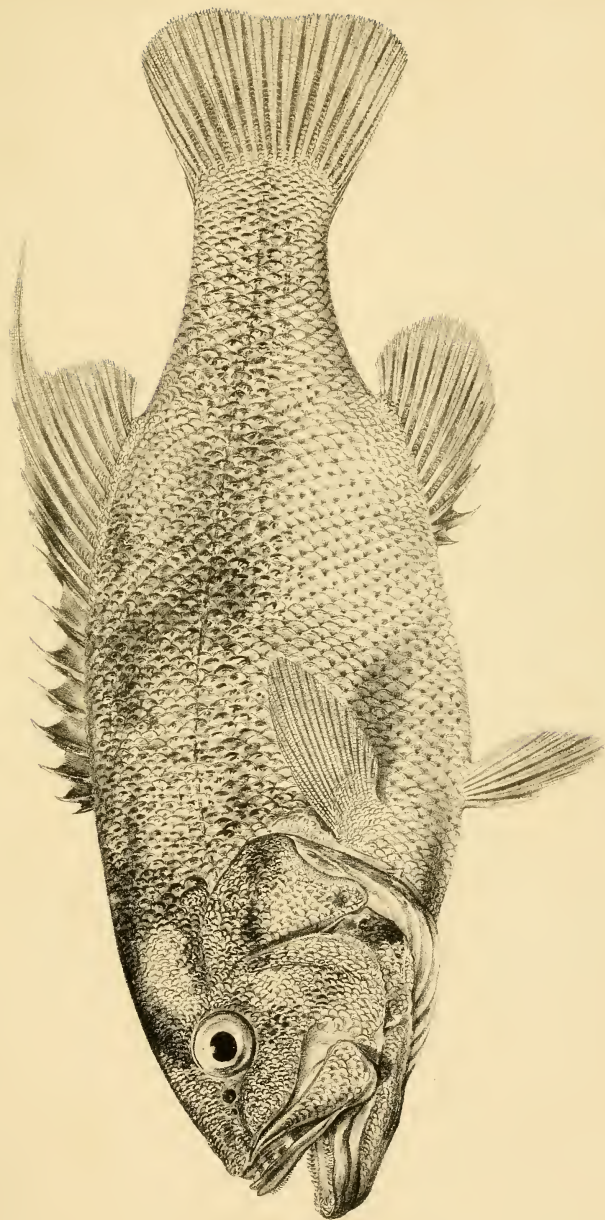


Drawn on copper by J. M. Smith

Engraved by J. M. Smith

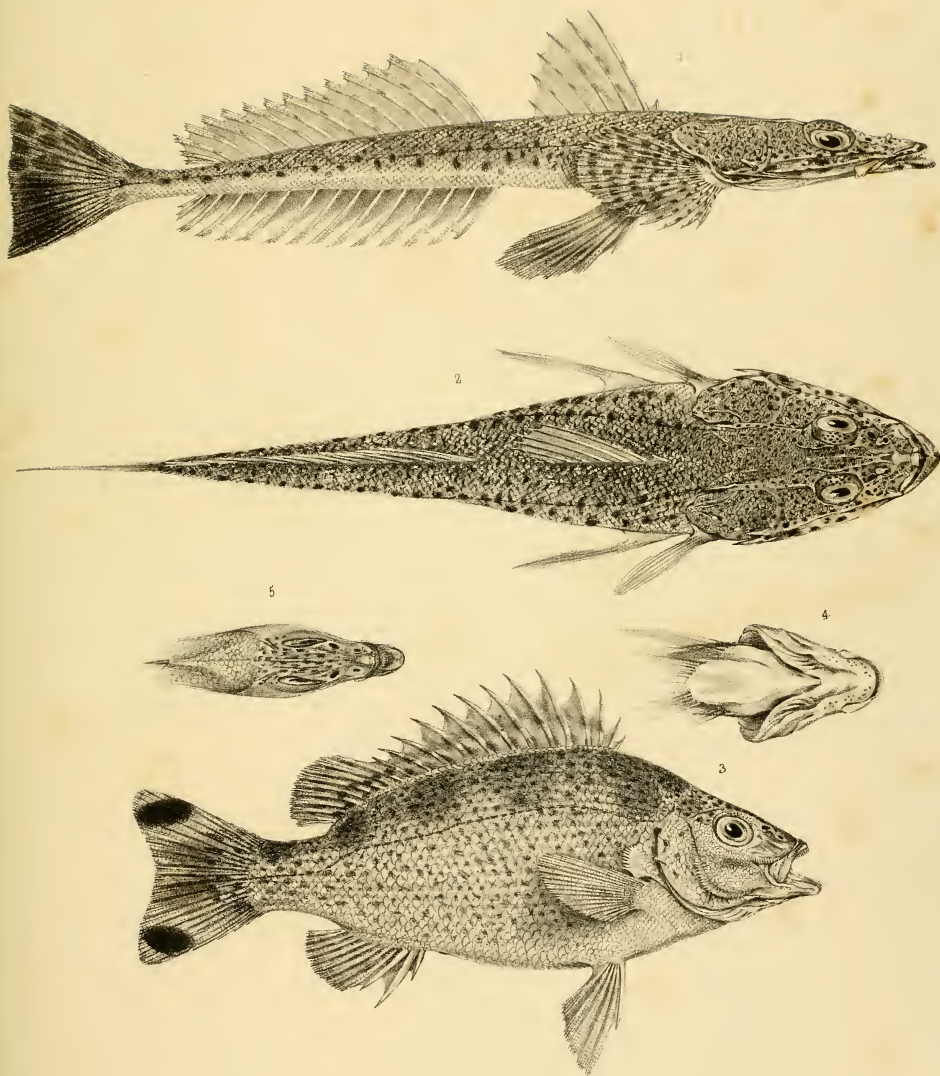
Fig. 1. *TRISOPTERUS PLEUROCANTICUS* R. & S. *DIAPAMMA POROSA*









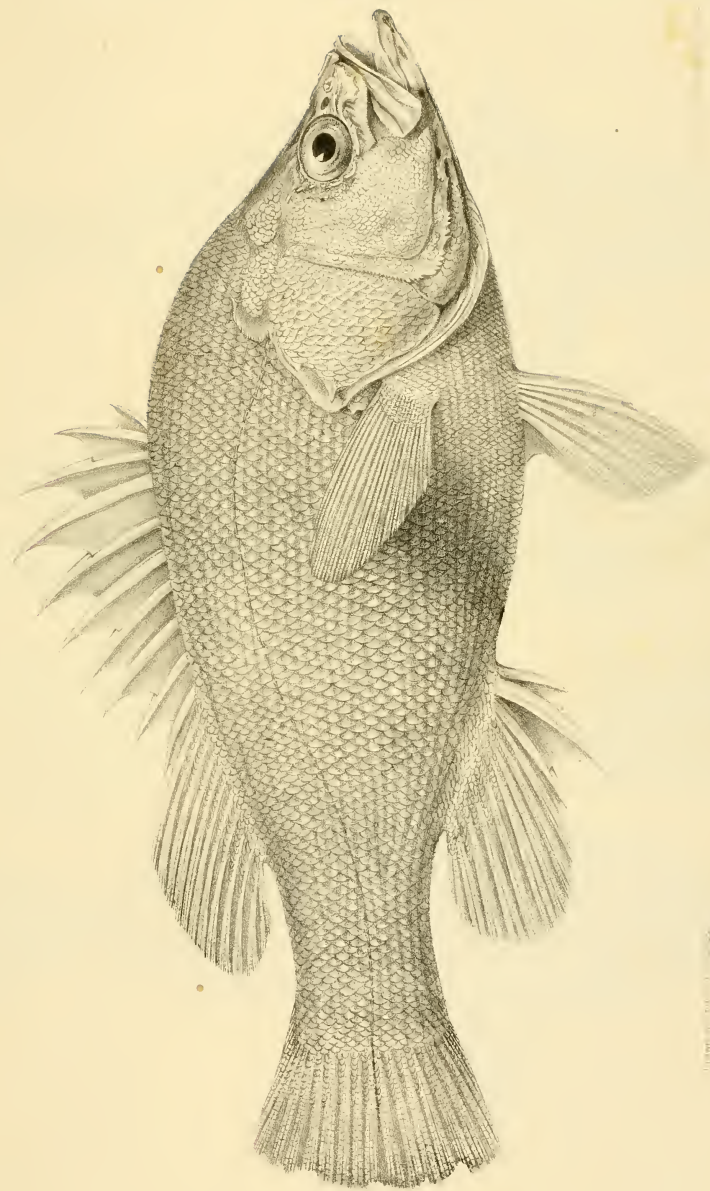


Drawn on Stone by W. Mitchell.

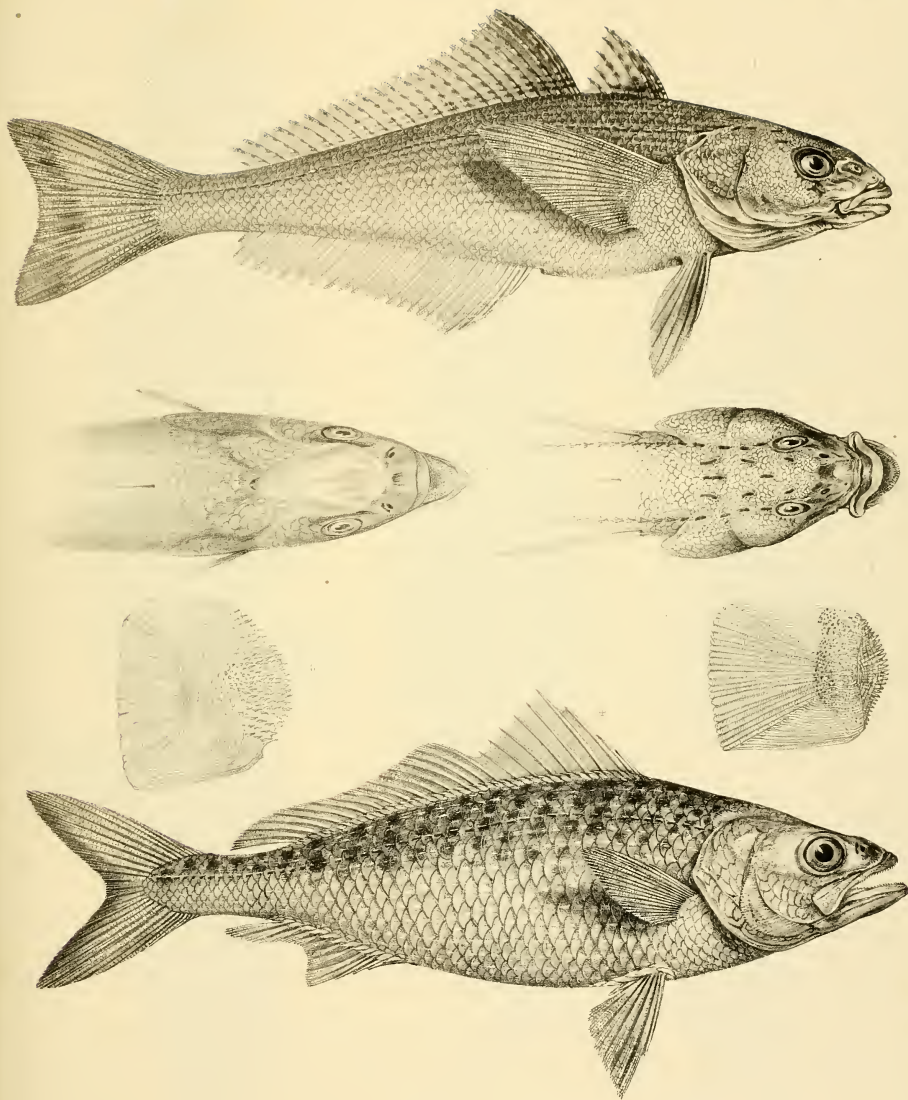
Printed by H. Mansel & Walton.

Fig 1, 2 PLATYCEPHALUS TASMANIUS 3, 4, 5 DATNIA CAUDAVITTATA.









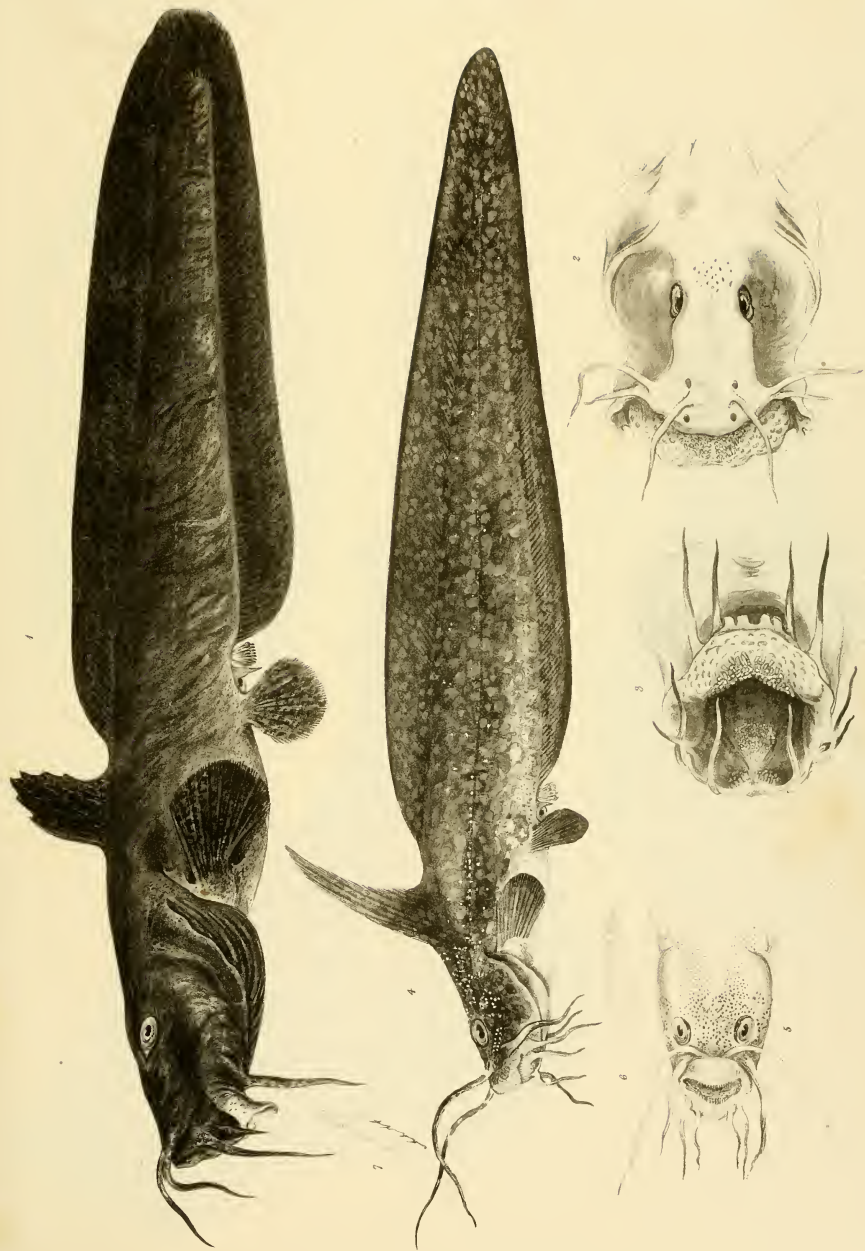
Drawn on Stone by W. Mitchell

Printed by H. K. Walcott & Walcott

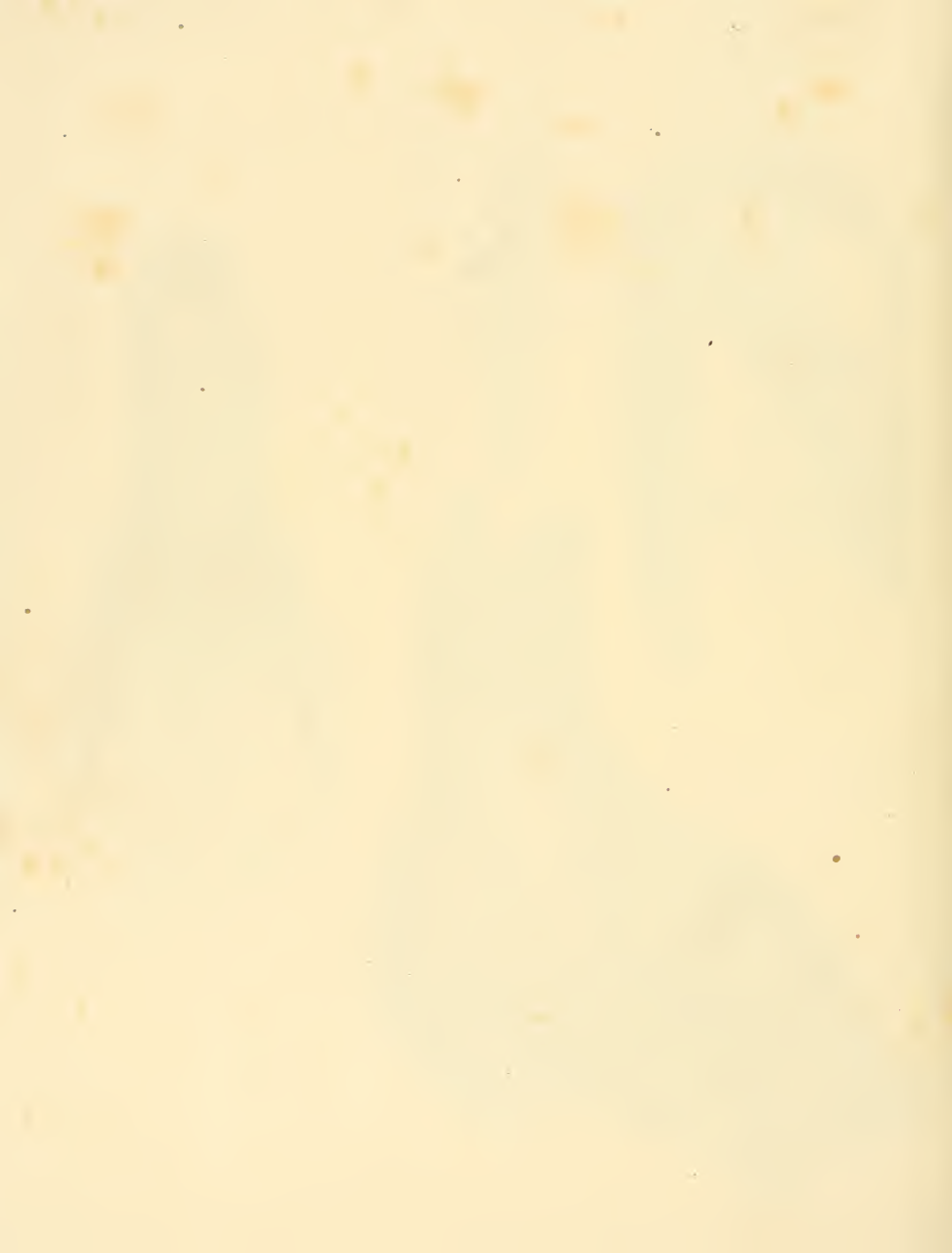
Fig. 1, 2, 3. *ELEGINUS FALKLANDICUS* 4, 5, 6. *CENTOPRISTES SALAR*.

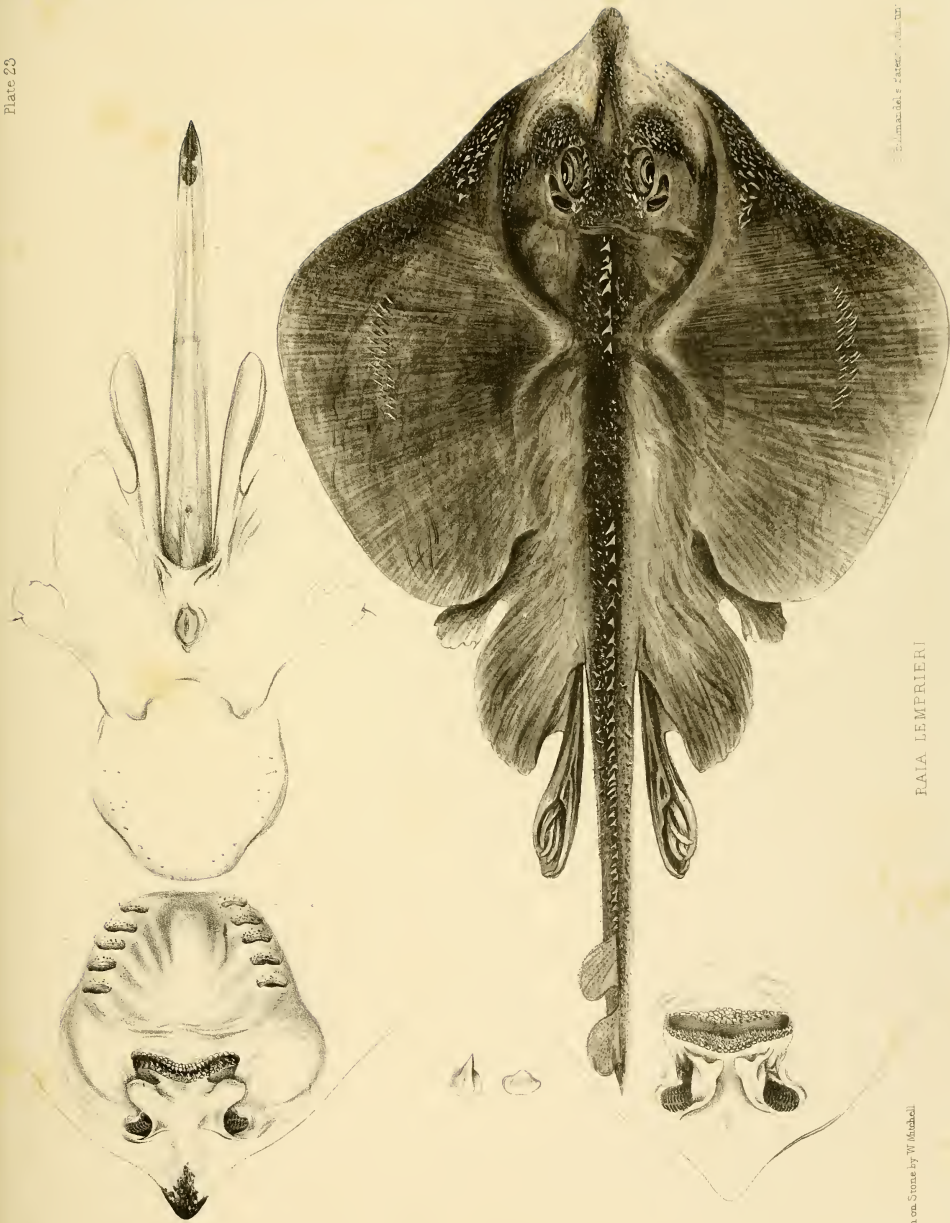






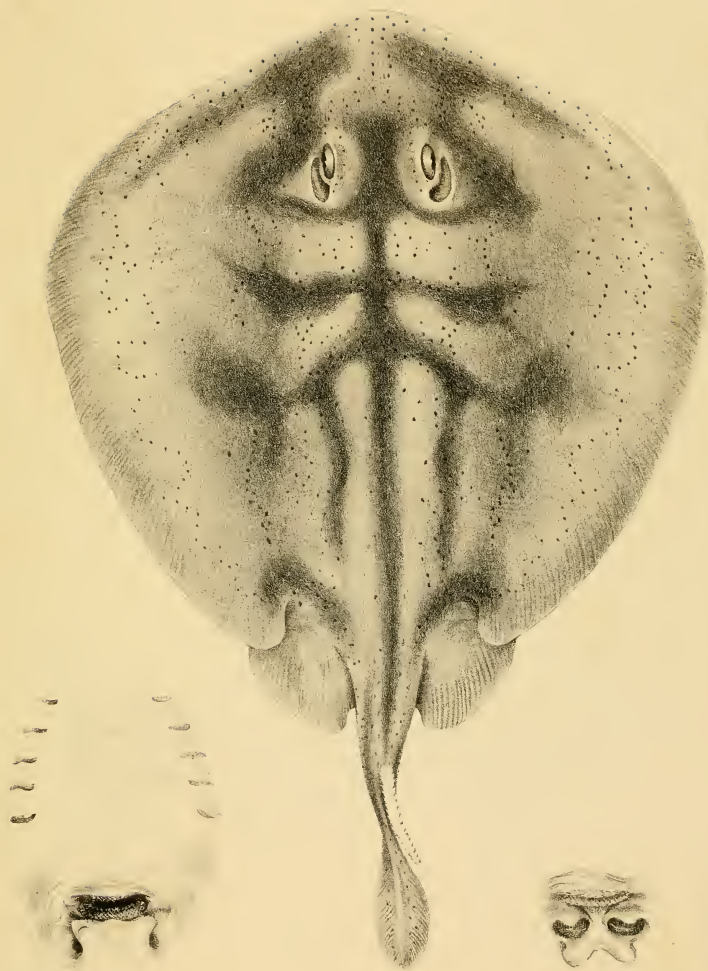
Figs. 1, 2. *Plotosus megastomus*. 3, 4, 5. *Plotosus microcephalus*.







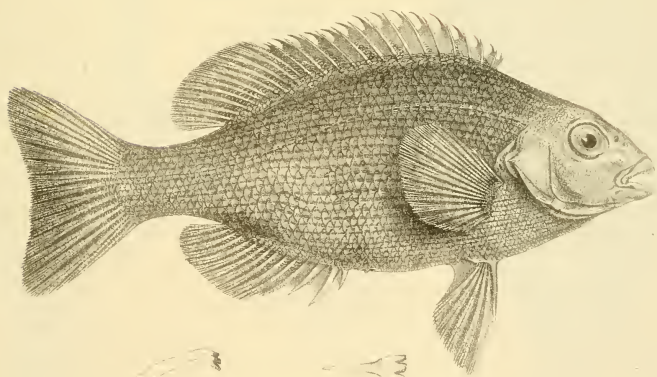
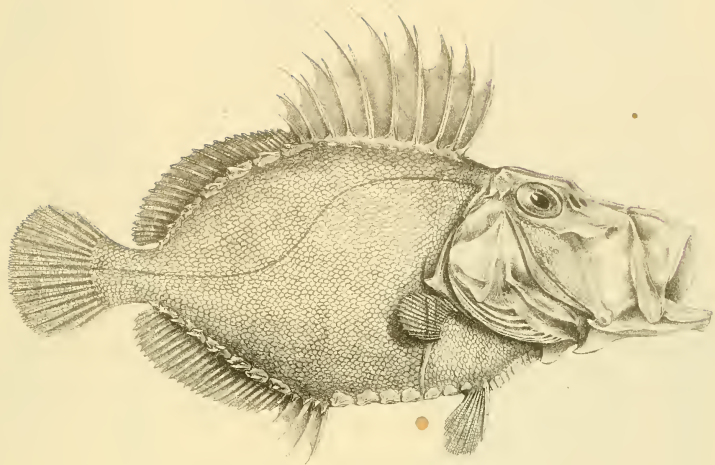


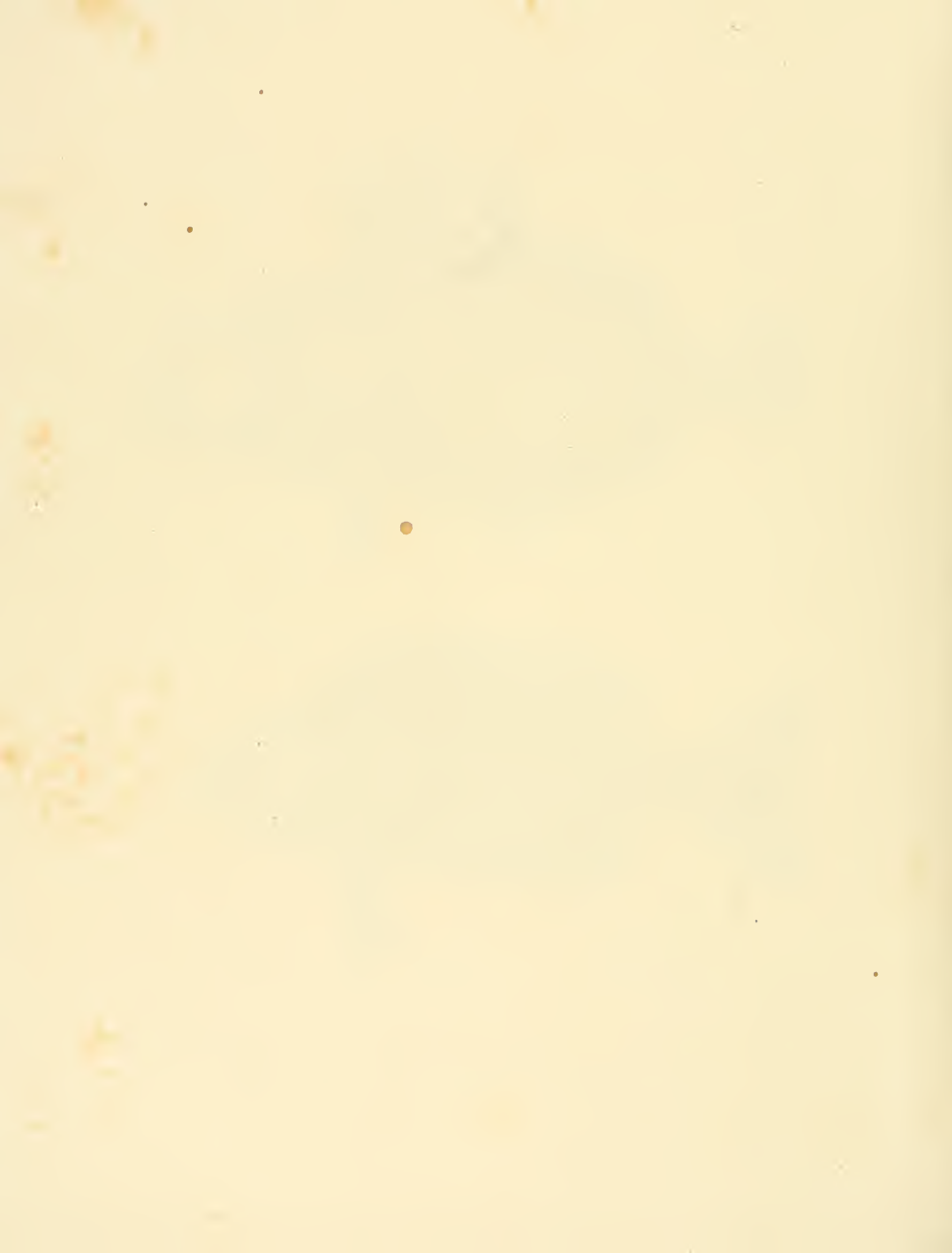


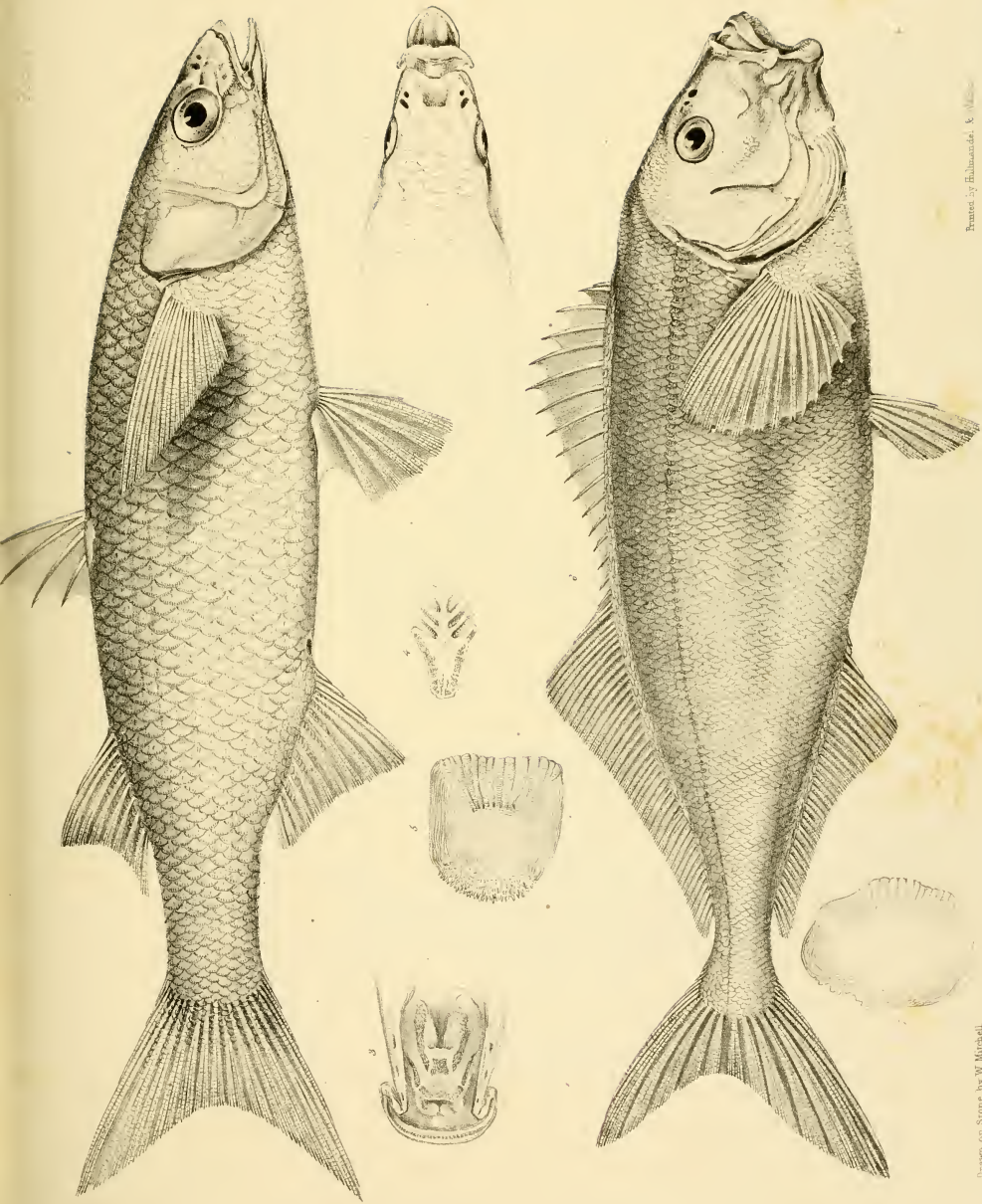
*ECHEINOPTERUS ECHINOPTERUS*

Plates 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100









Printed by H. K. & Co.

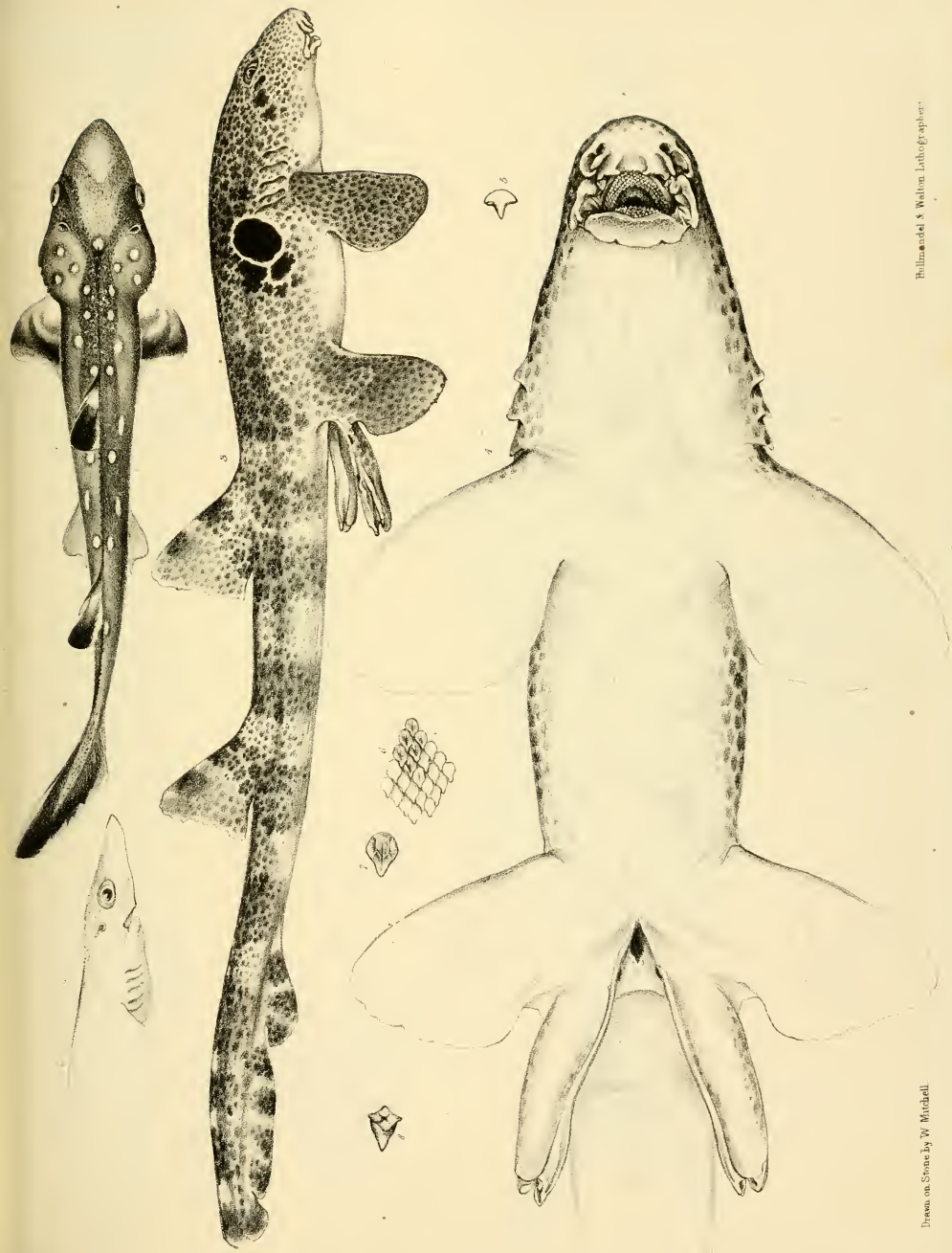
Drawn on Stone by W. Marshall





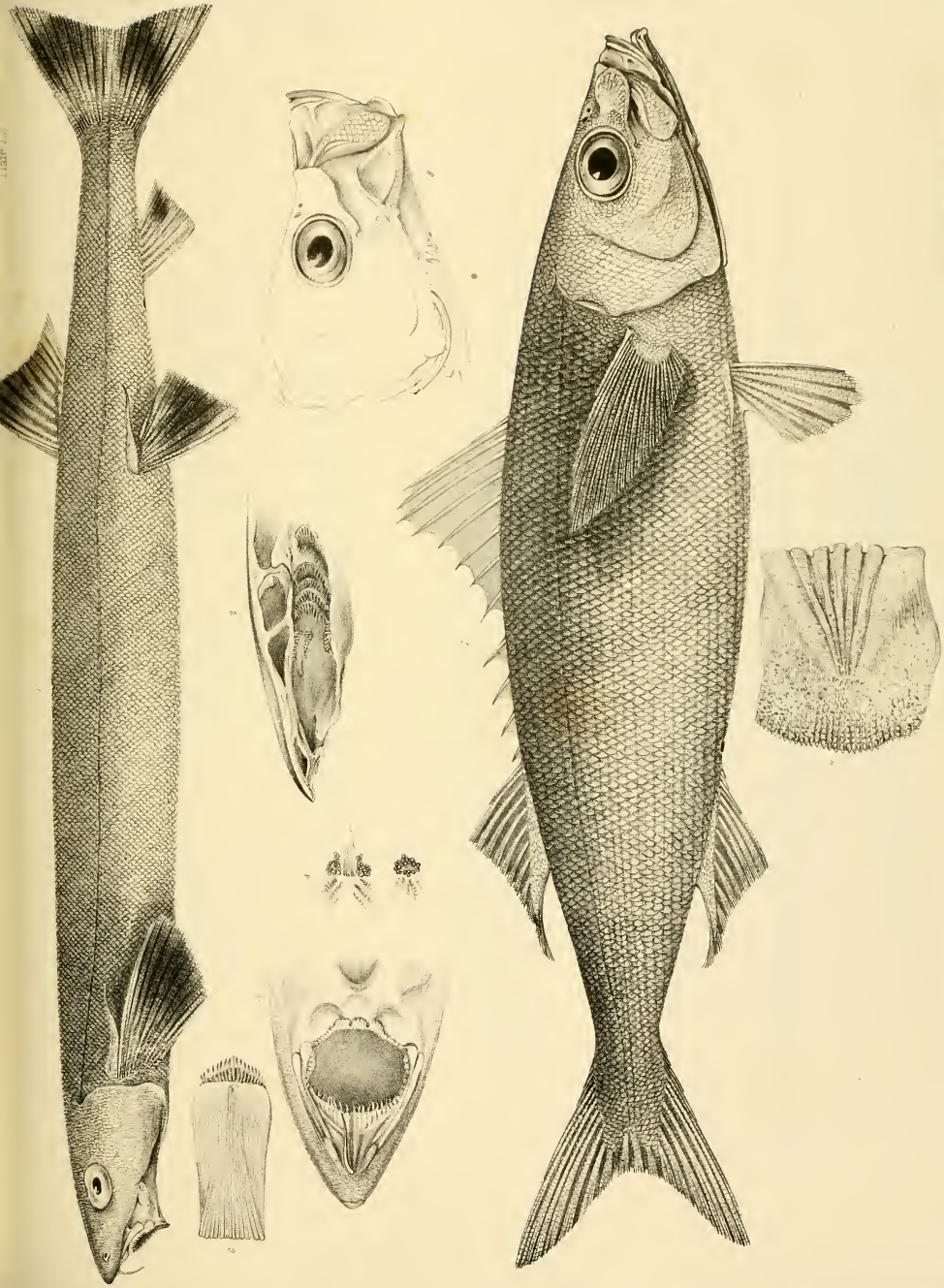














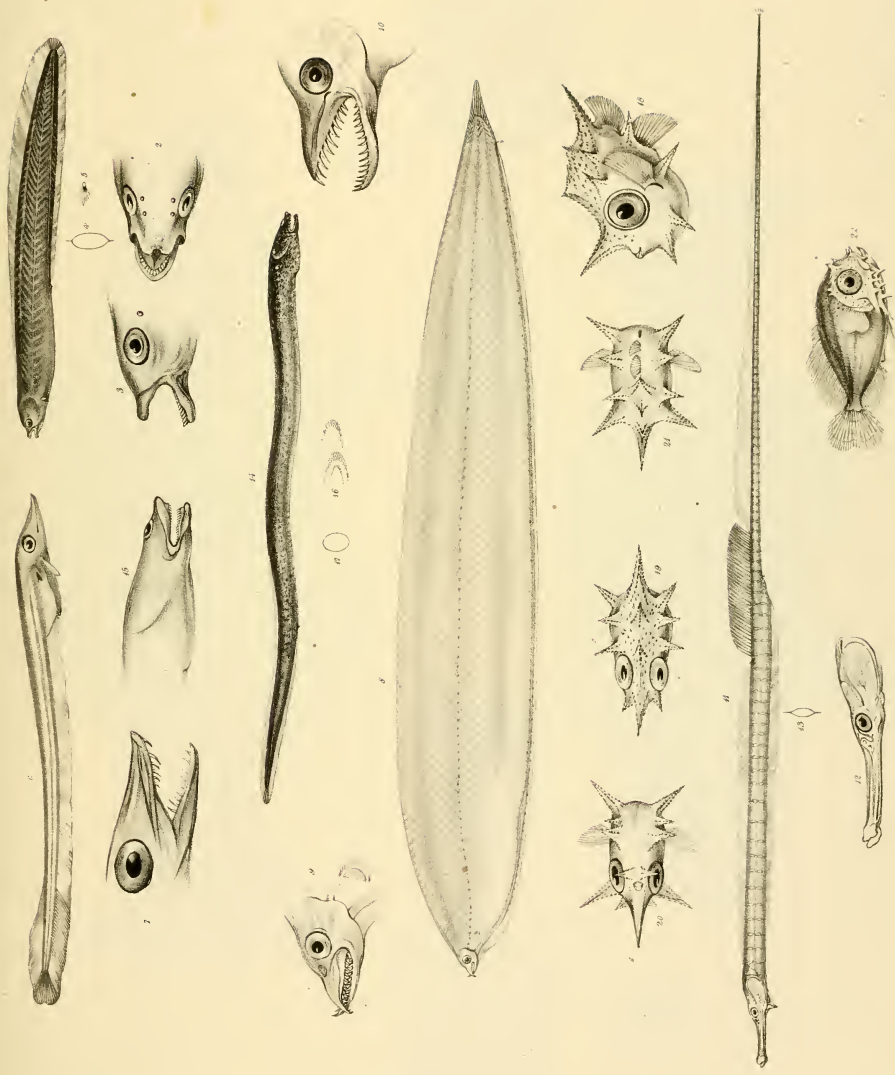
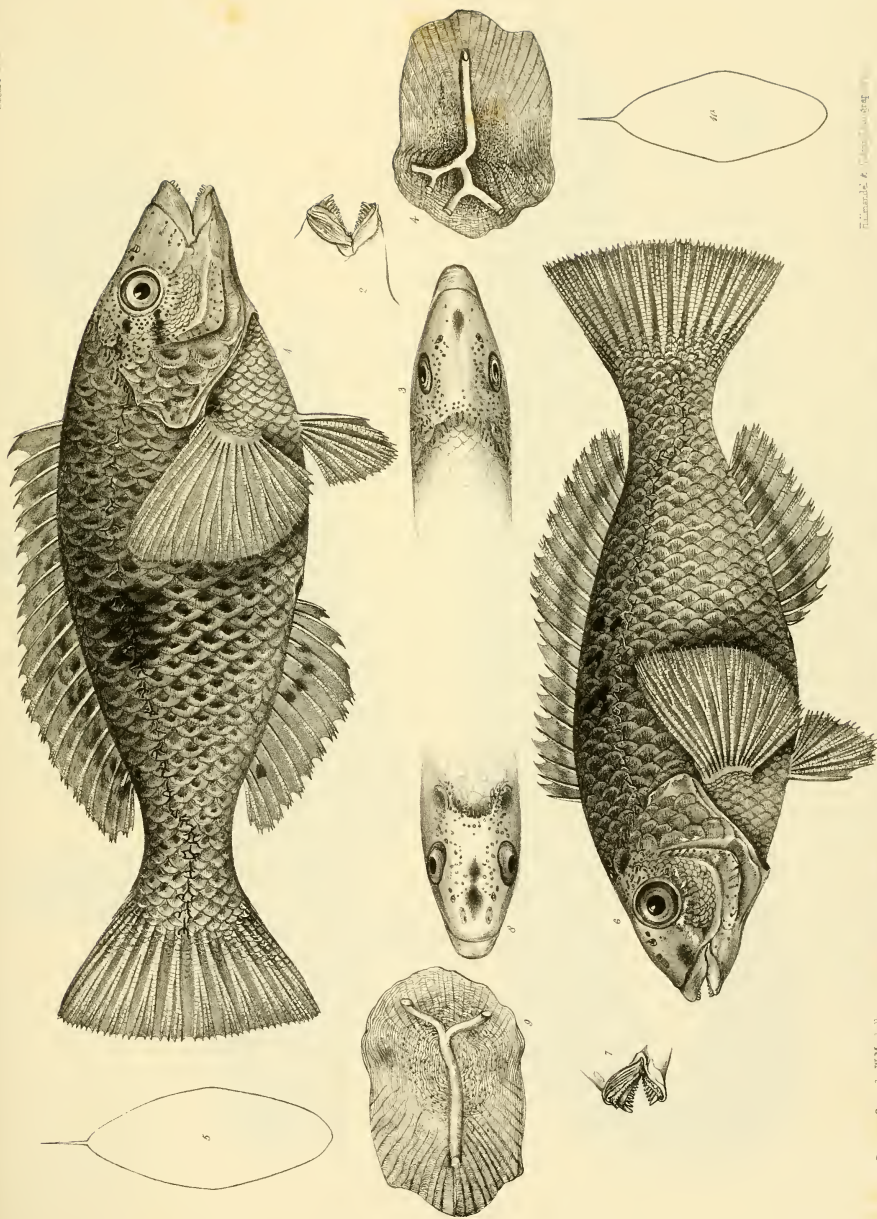


Fig. 14-19. *SYNGNATHUS GUTTURALIS*.  
 1. Lateral view. 2. Head and mouth. 3. Head and mouth. 4. Head and mouth. 5. Head and mouth. 6. Head and mouth. 7. Head and mouth. 8. Head and mouth. 9. Head and mouth. 10. Head and mouth. 11. Head and mouth. 12. Head and mouth. 13. Head and mouth. 14. Head and mouth. 15. Head and mouth. 16. Head and mouth. 17. Head and mouth. 18. Head and mouth. 19. Head and mouth. 20. Head and mouth. 21. Head and mouth. 22. Head and mouth.

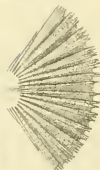
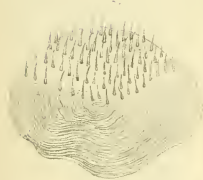
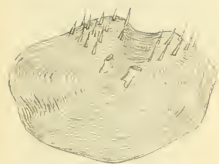
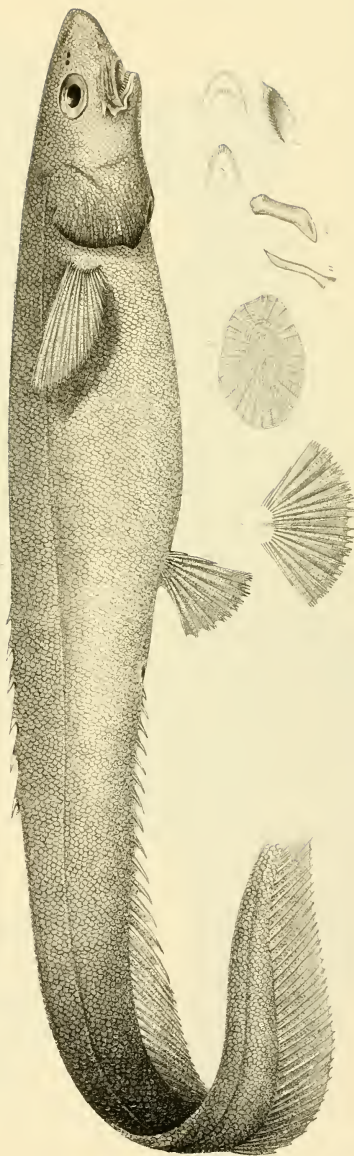
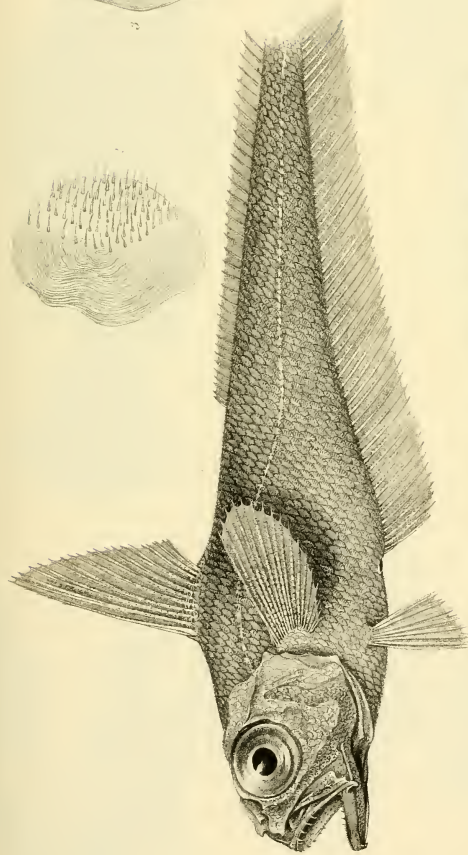




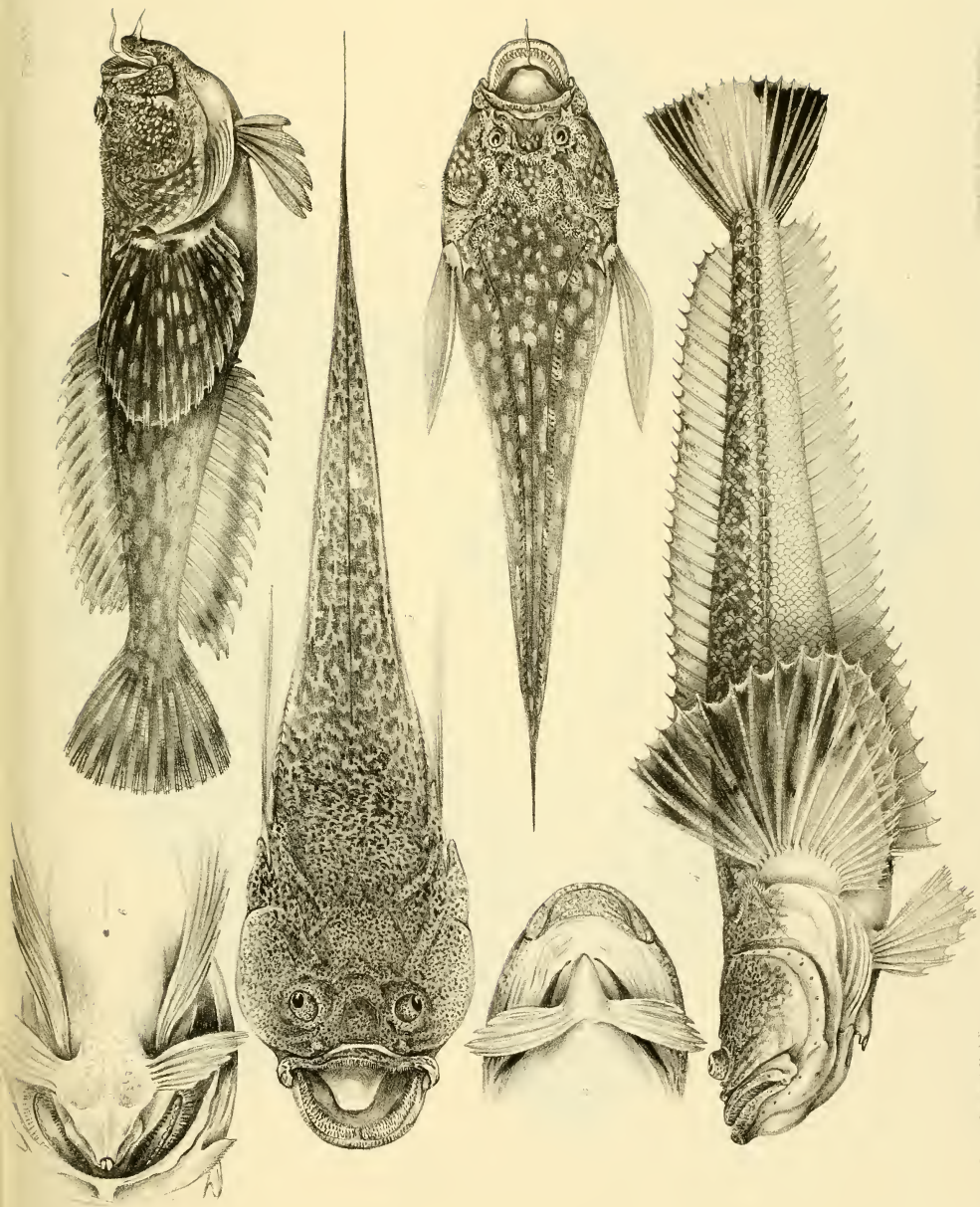






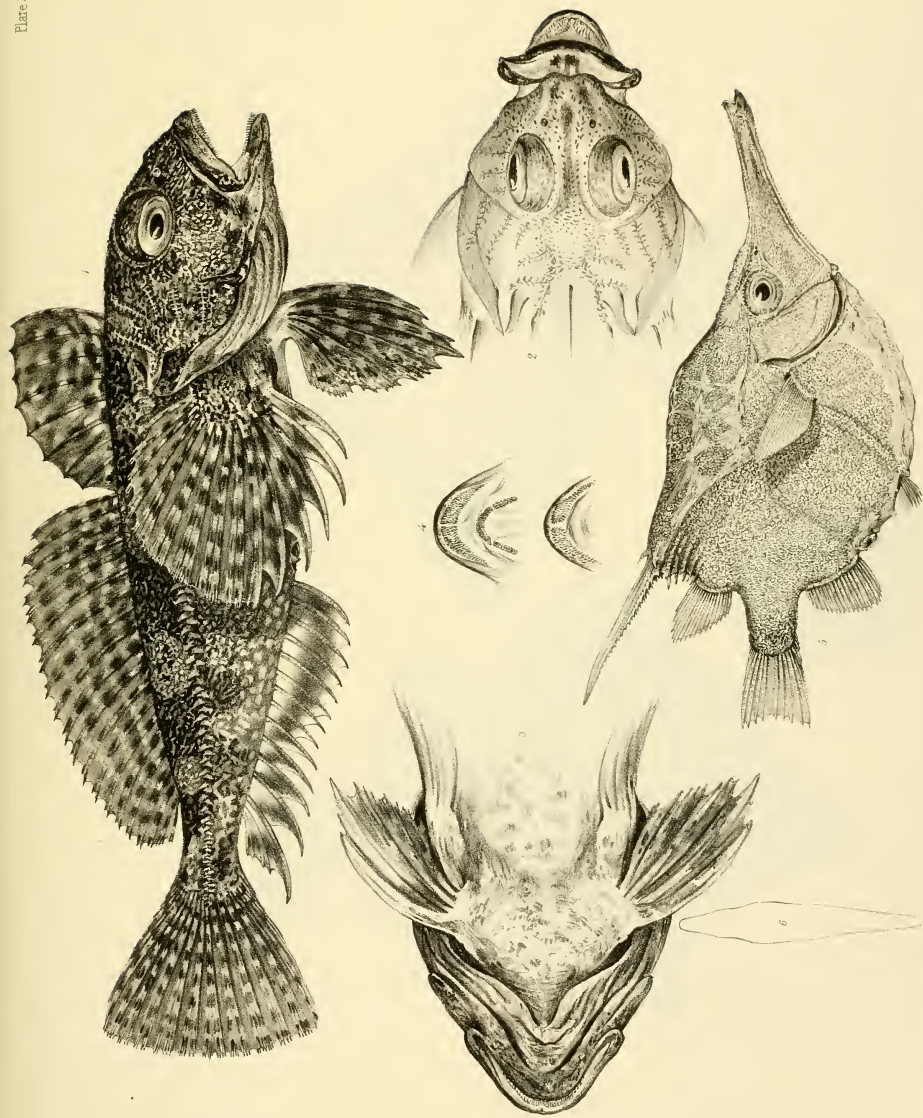




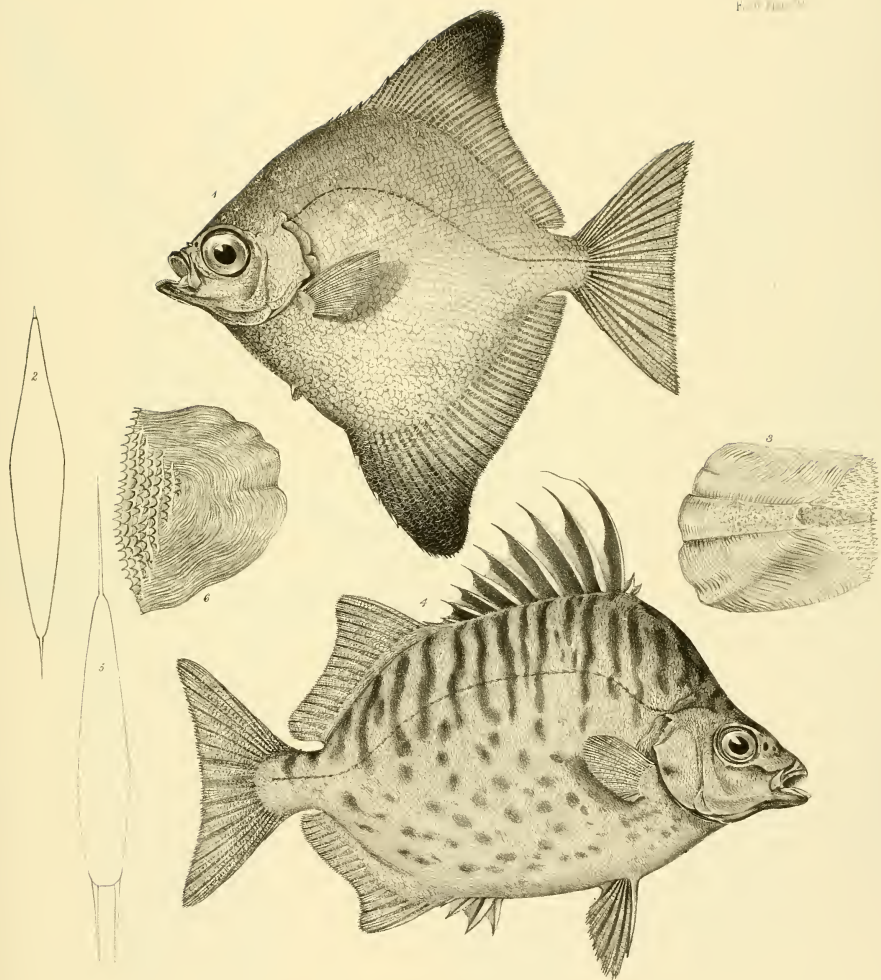










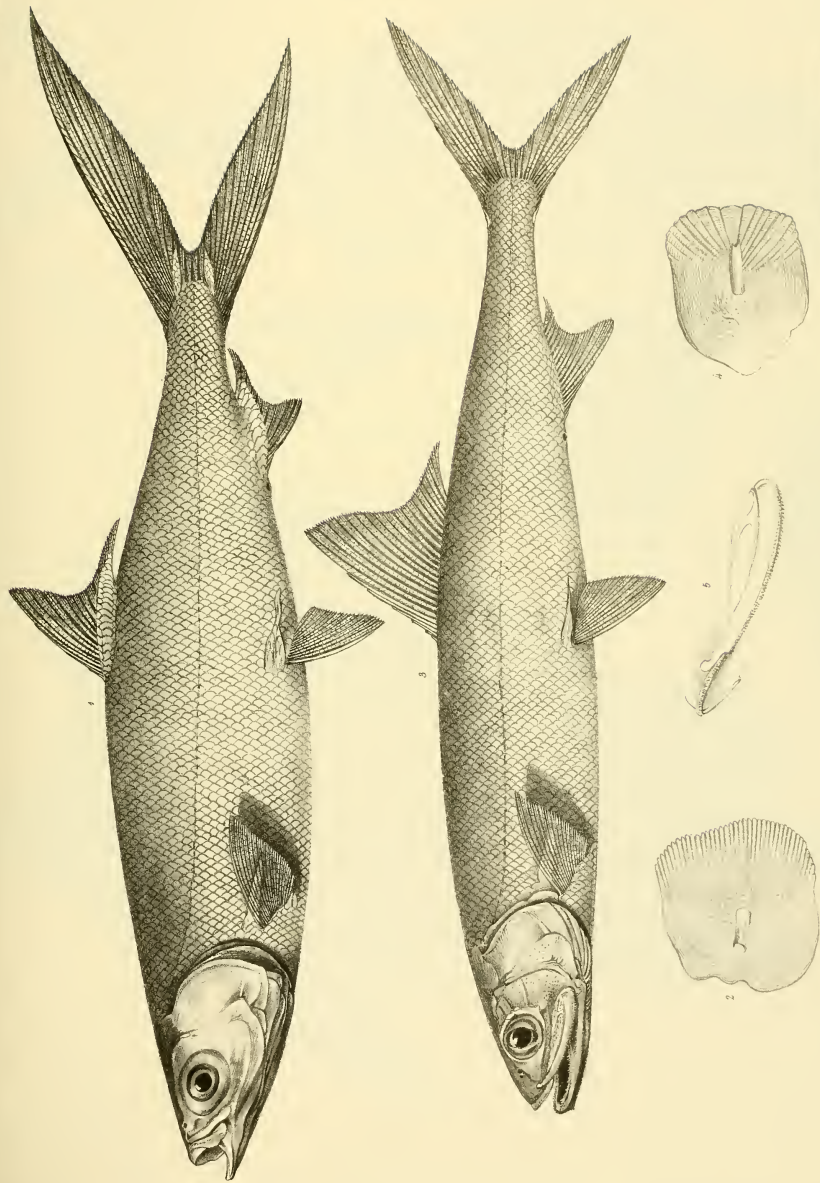


Drawn on Stone by W. Mitchell.

Hollmann & Walter Lithographers

Fig 1-3 PSETTUS ARGENTUS Fig 4-6 SCATOPHAGUS MULTIFASCIATUS





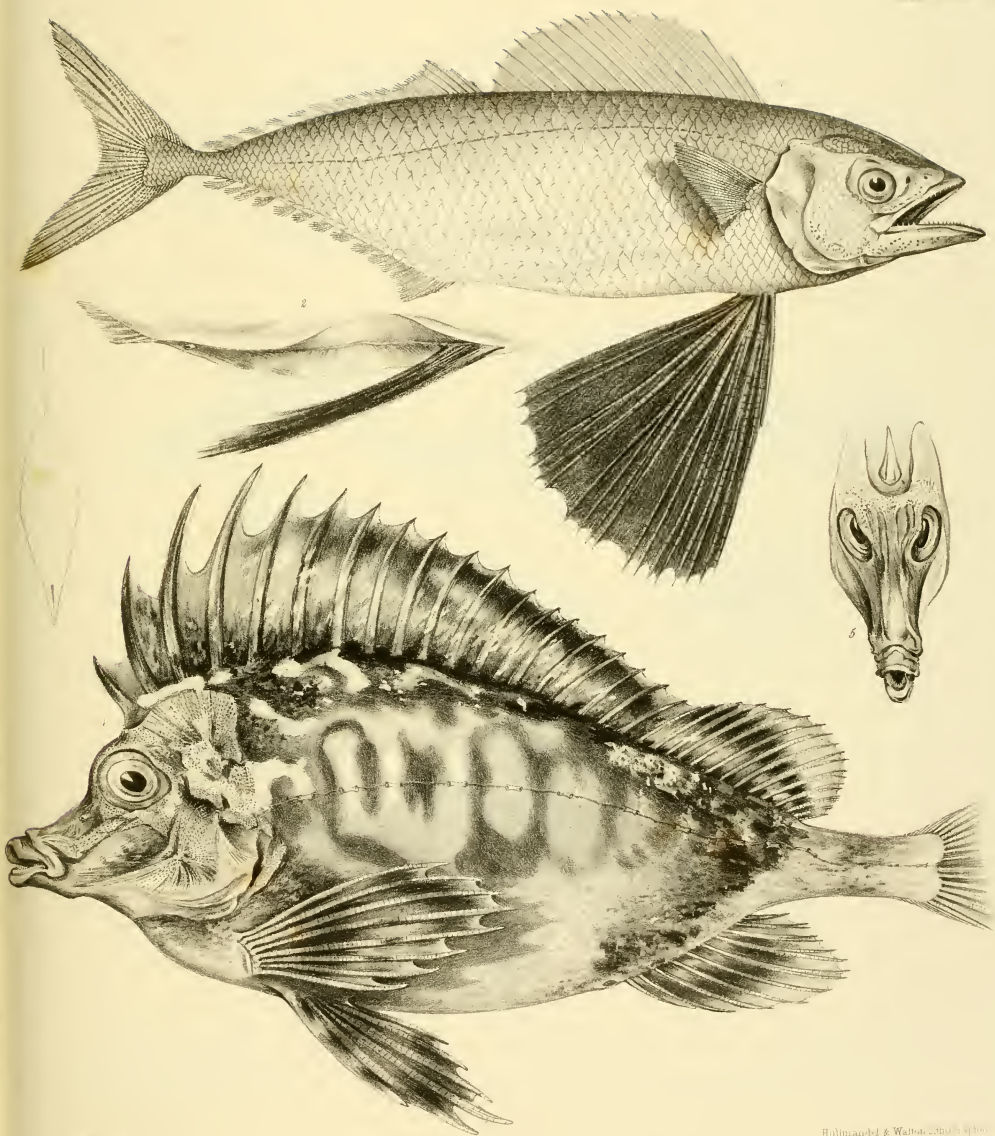
Drawn on Stone by W. Meckel

Fig. 1. 2. *LUTODEIRA SALMONEA* Fig. 3-5. *ELOPS MACHNATA*

*Lutodeira salmonea* (Wilson) (Cope)





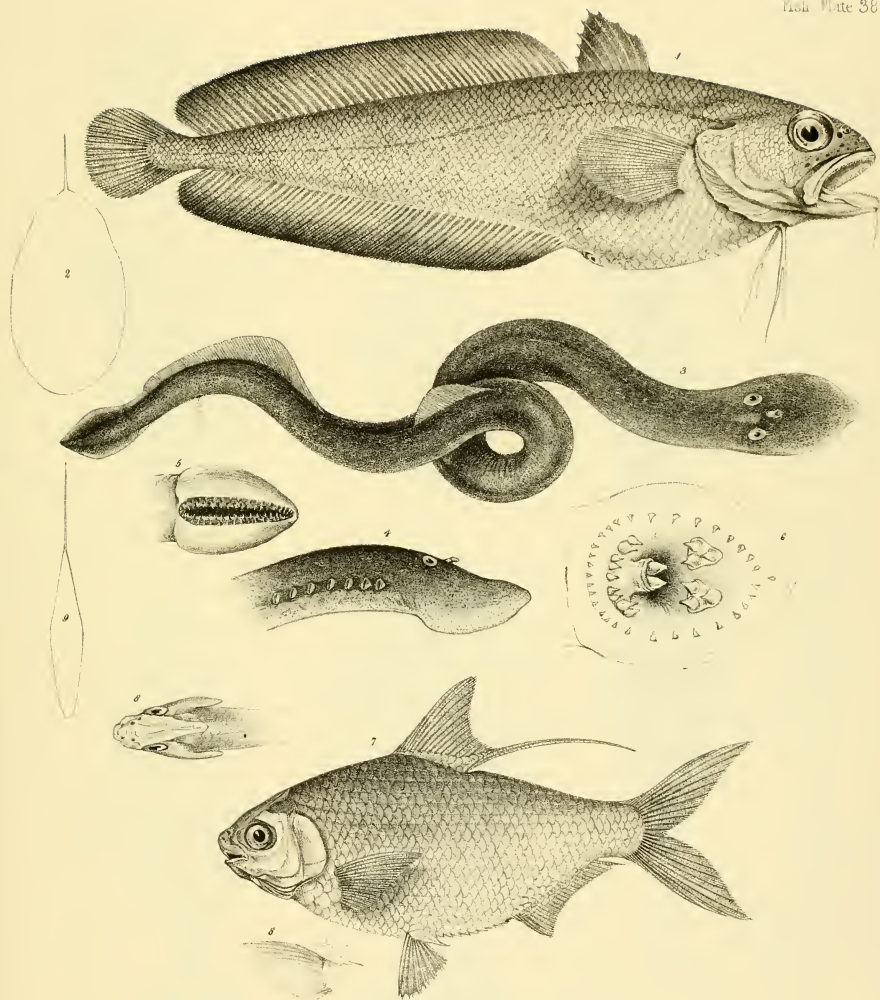


Drawn at once by W. Marshall

Holman and Watson, 1860, p. 100

Fig. 4. *CASTROCHILUMA MELAMPUS* Fig. 5. *AGRIOPUS LEUCOPCEILUS*





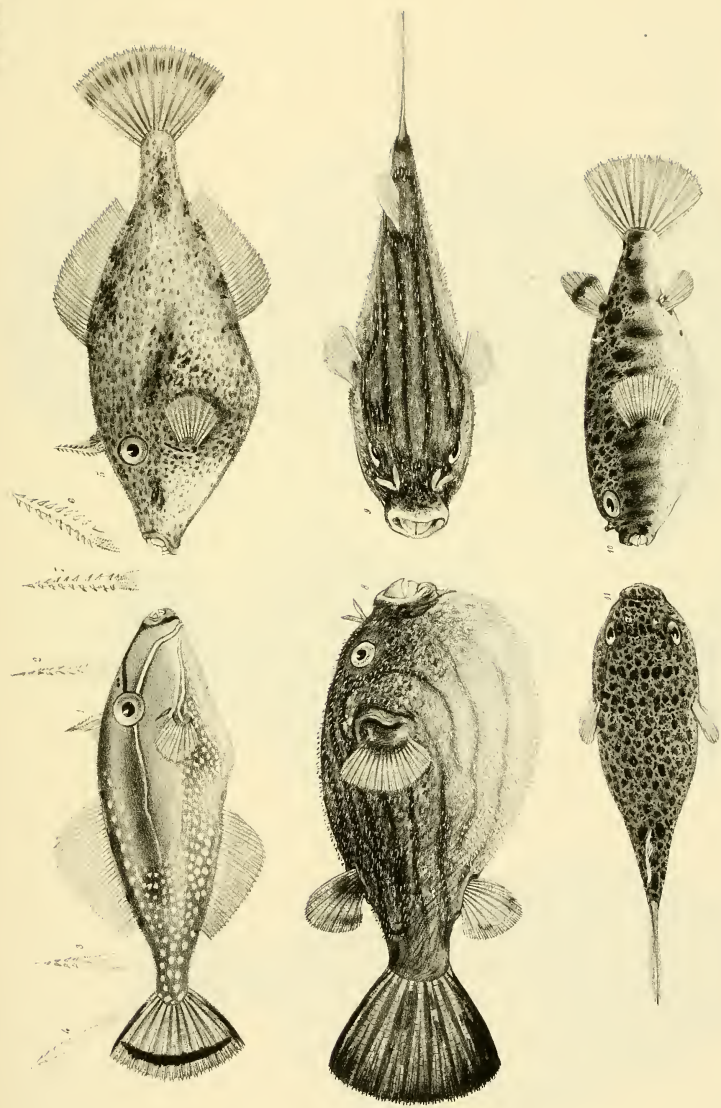
Drawn on Stone by W. Mitchell

Hallman & Watson Lithographers

Fig 1. 2. *LOTA BREVIUSCULA* Fig. 3. 6. *PETROMYZON MORDAX* Fig 7. 10. *CHATOESSUS COME*.





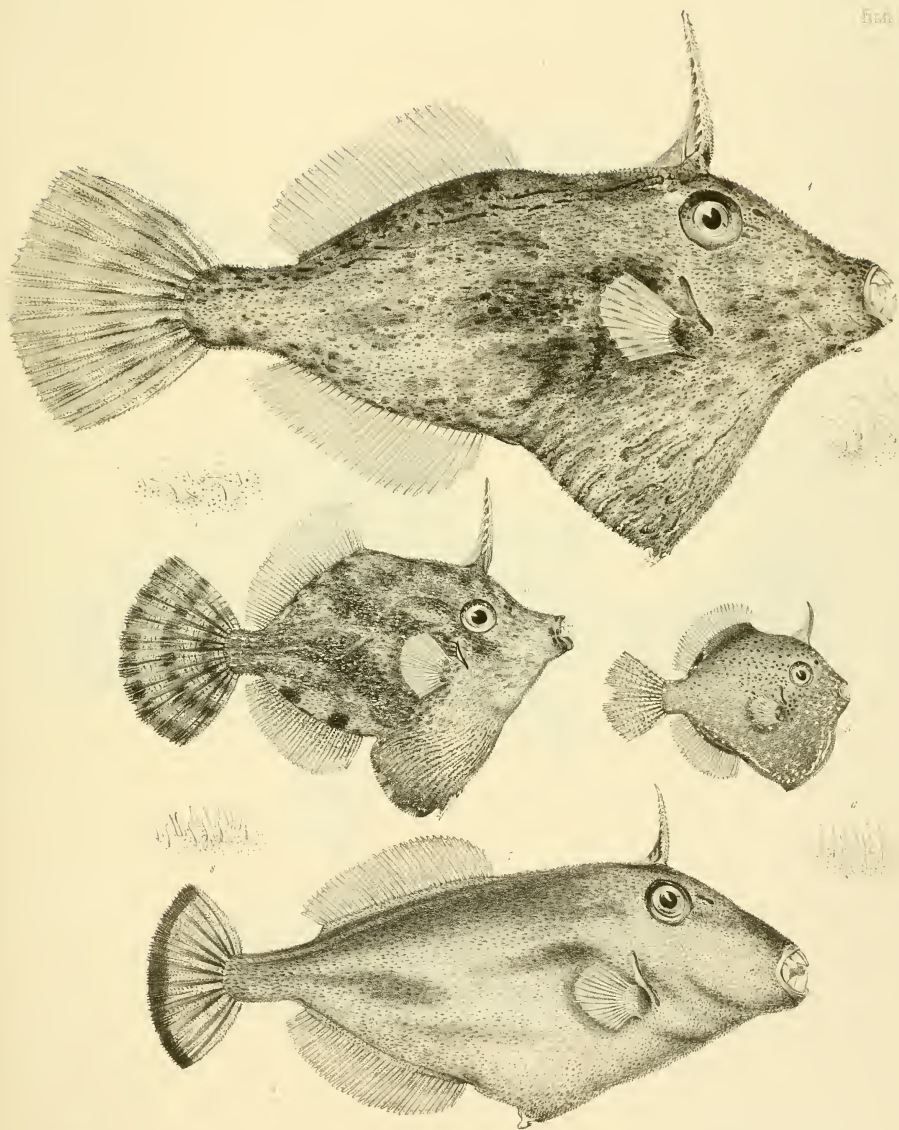


Drawn on Stone by W. Marshall

Illustrated by W. Marshall, Esq.

Fig. 1. ALUTARIUS PARAGAUDATUS. Fig. 5. ALUTARIUS MACULOSUS. Fig. 8. 9. TETODON VIRGATUS. Fig. 10. TETODON VIRGATUS.





Drawn on Stone by W. Mitchell

Hall and Walcott Lithographers

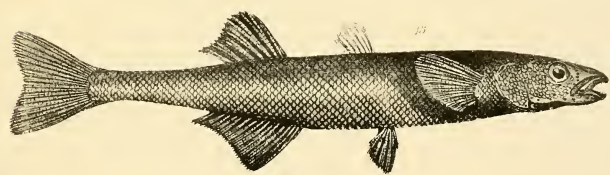
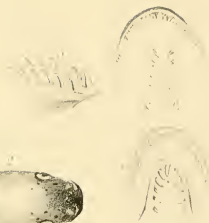
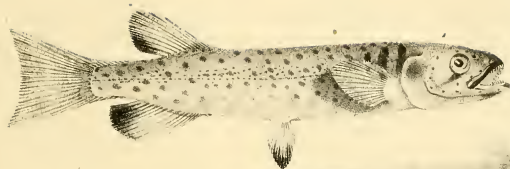
Fig. 1. 2. *MONACANTHUS GRANULATUS* 3. 4. *M. CHINENSIS* 5. 6. *ALUTARIUS TROSSULUS* 7. 8. *MONACANTHUS RUDIS*









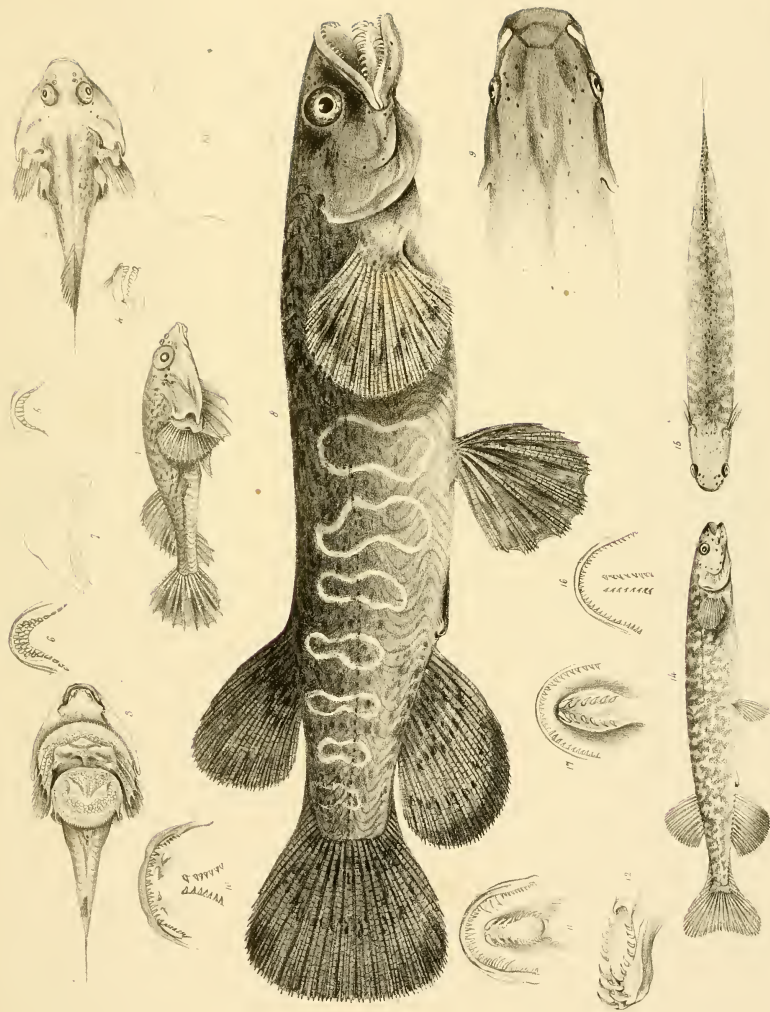


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Bullman & Walton Lithographers

Fig. 1. GALAXIAS TRUTTACHII Fig. 2. GALAXIAS PETICULATUS Fig. 3, 4, 5, 6. Atherina nigricans



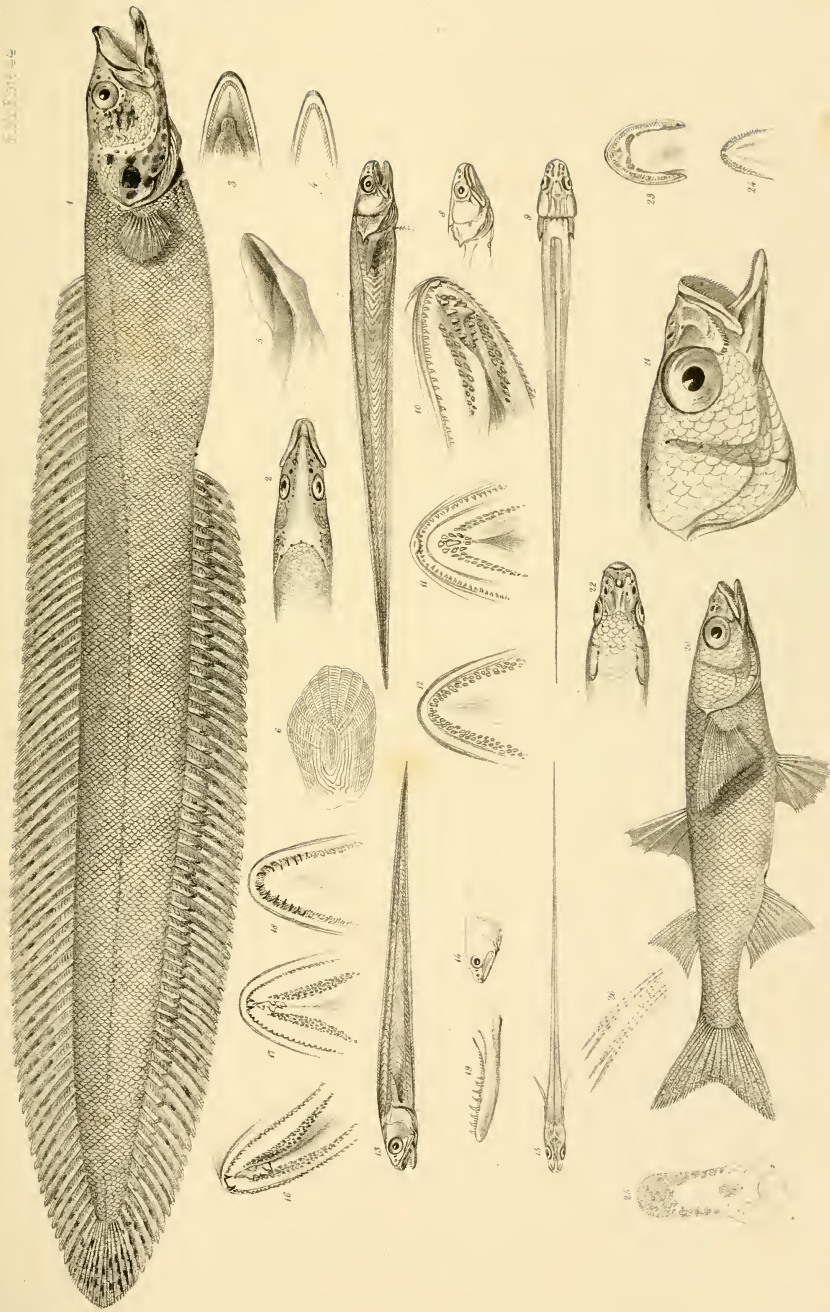


Drawn on Stone by W. M. D. H. - 11.

Zeilmandel &amp; Wälden. (Lith. Sphaer.)









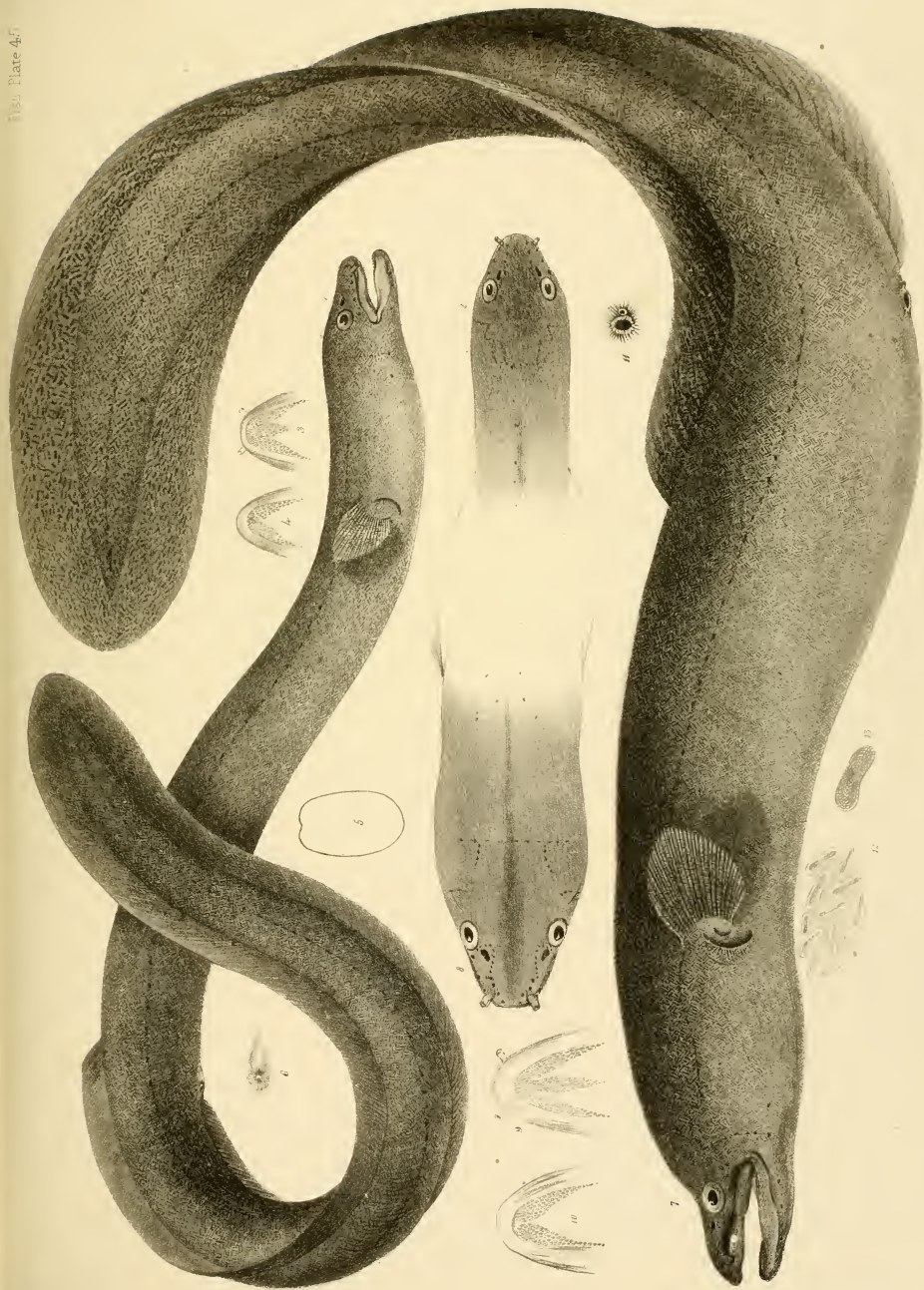














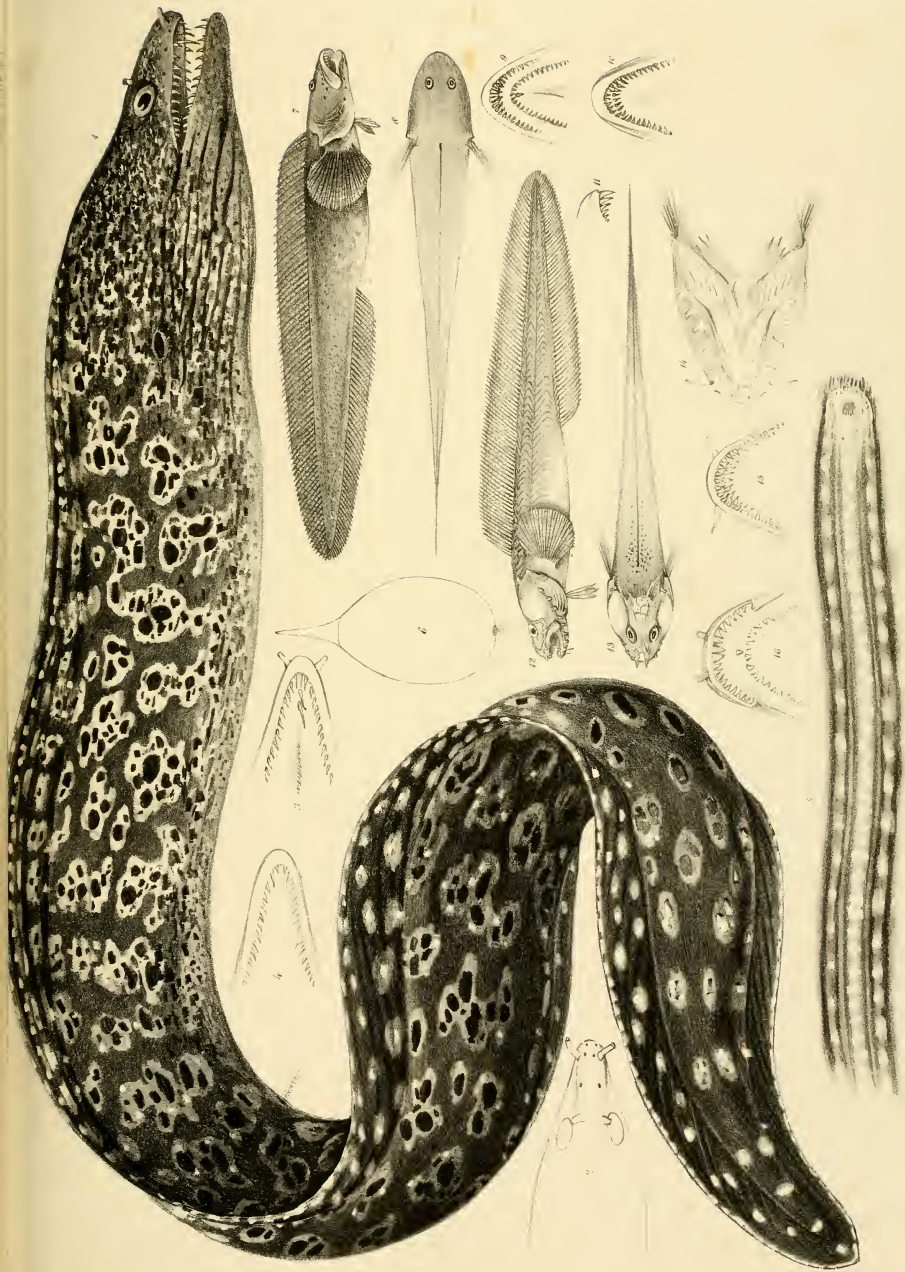
Fig. 1. *MURENA VARIEGATA* LINNÉ. Fig. 2-10. *MURENA* *variegata* LINNÉ.



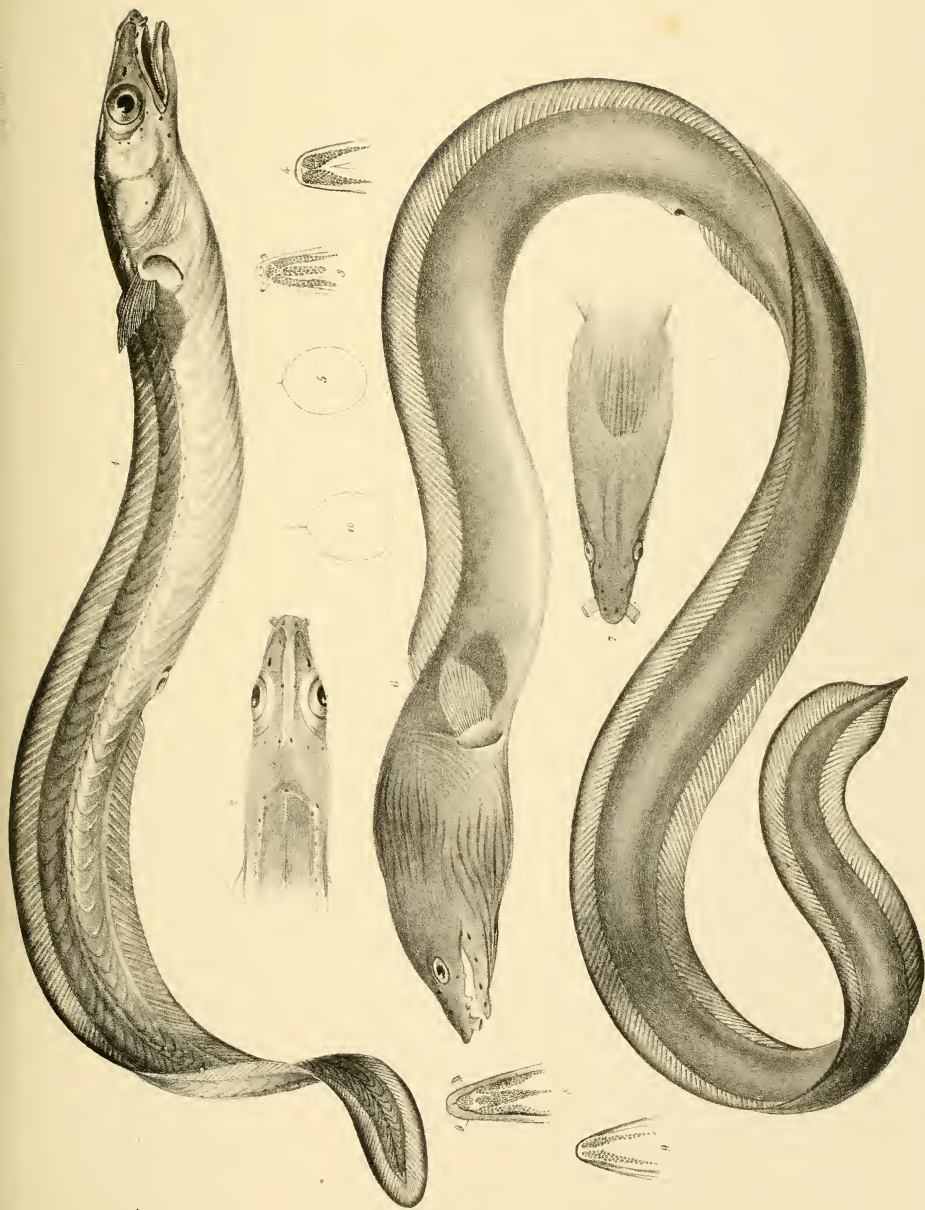


















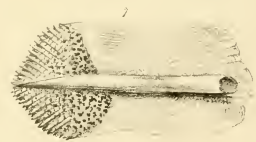
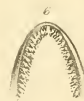
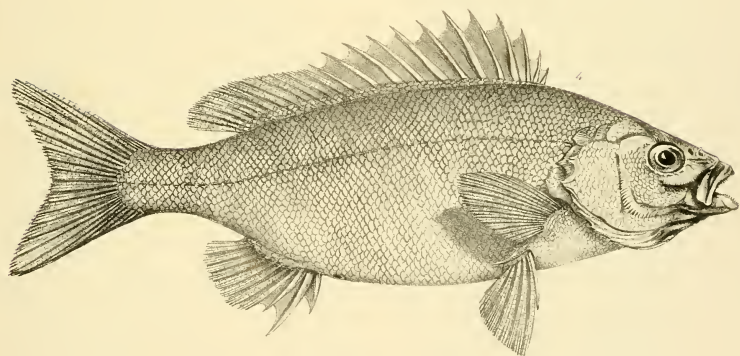
Drawn on Stone by W. Mitchell.

Enlarged & Water-Lithographed.

FIG 1.6 SAURUS UNDOSQUAMIS FIG 7.9 FLATYCEPHALUS CIRRONANUS





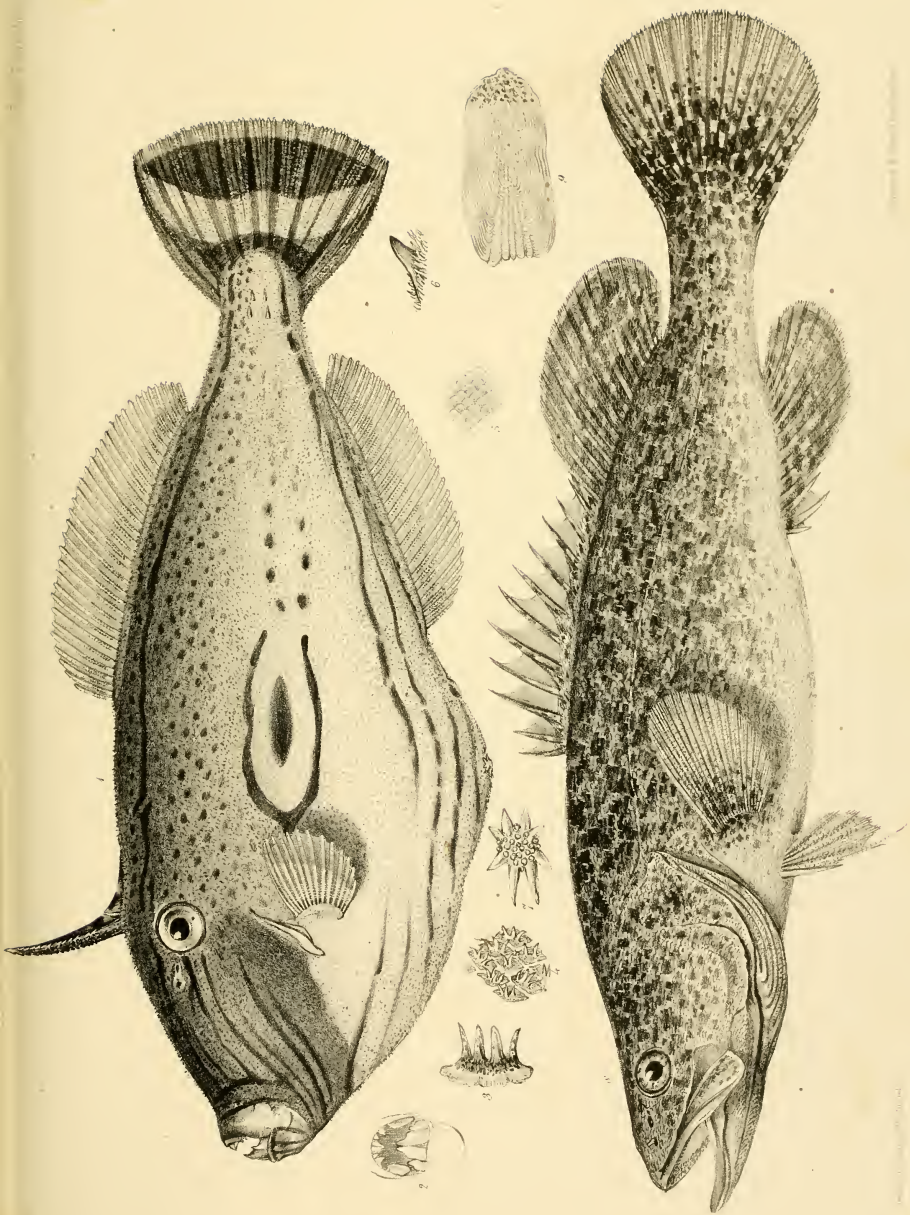


—A. G. S. W. G. S.

—A. G. S. W. G. S.

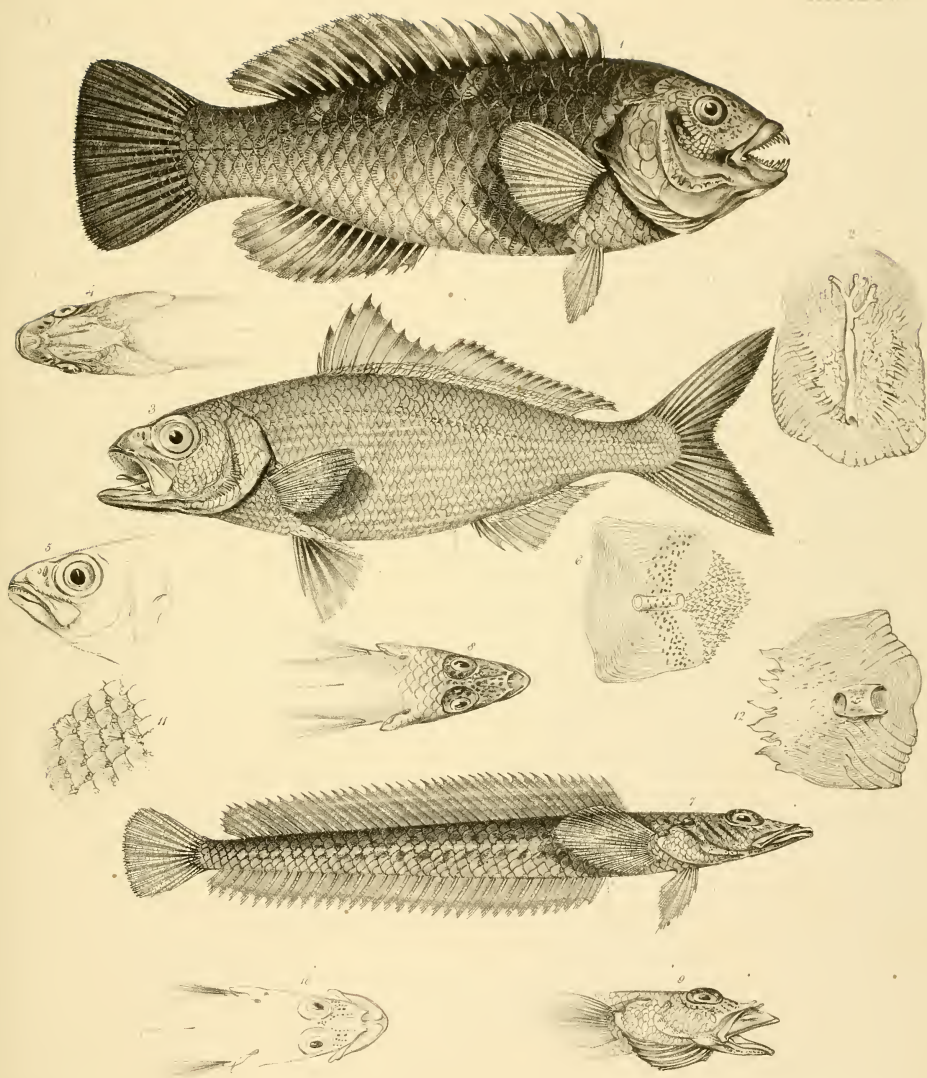
THE ... OF THE ...

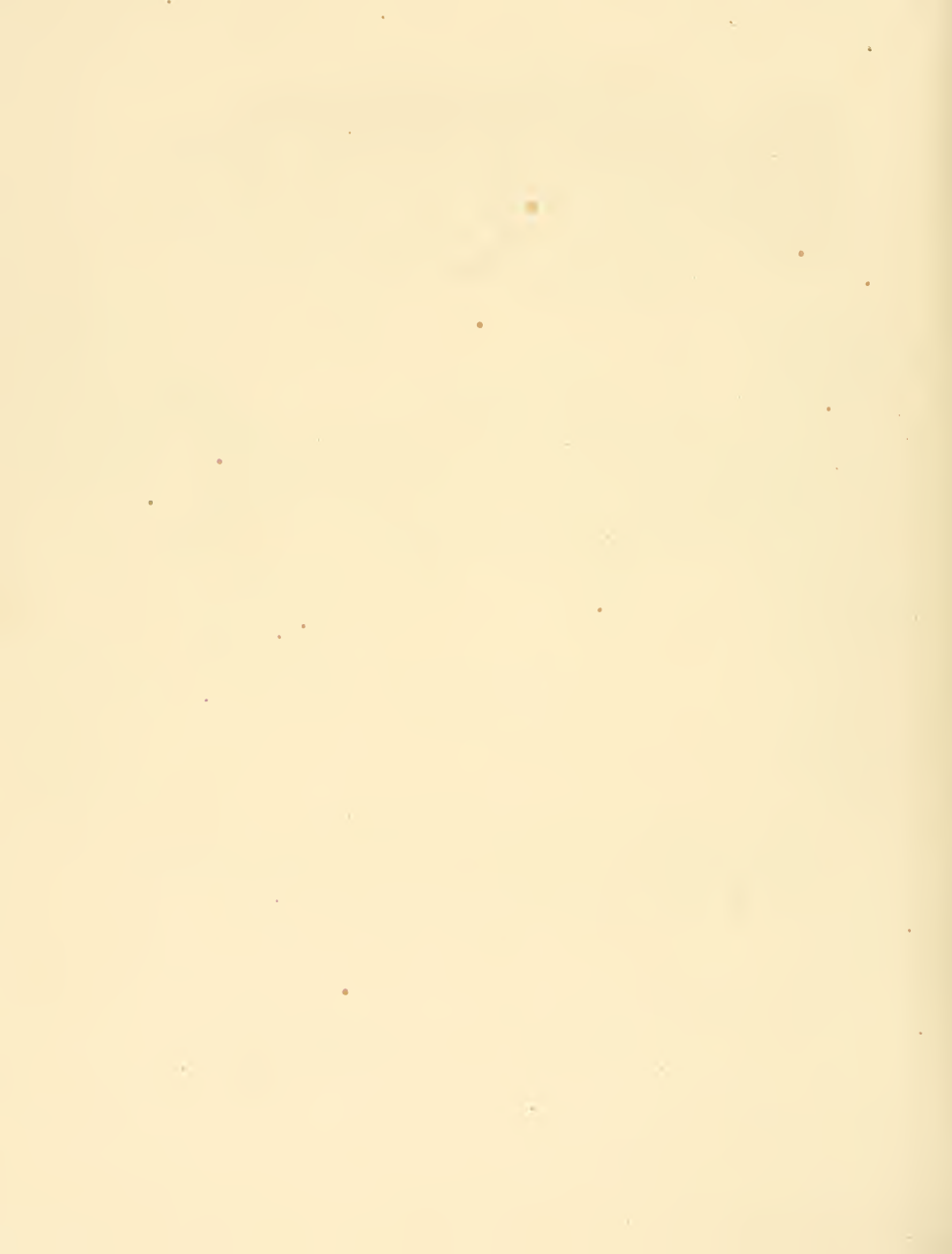


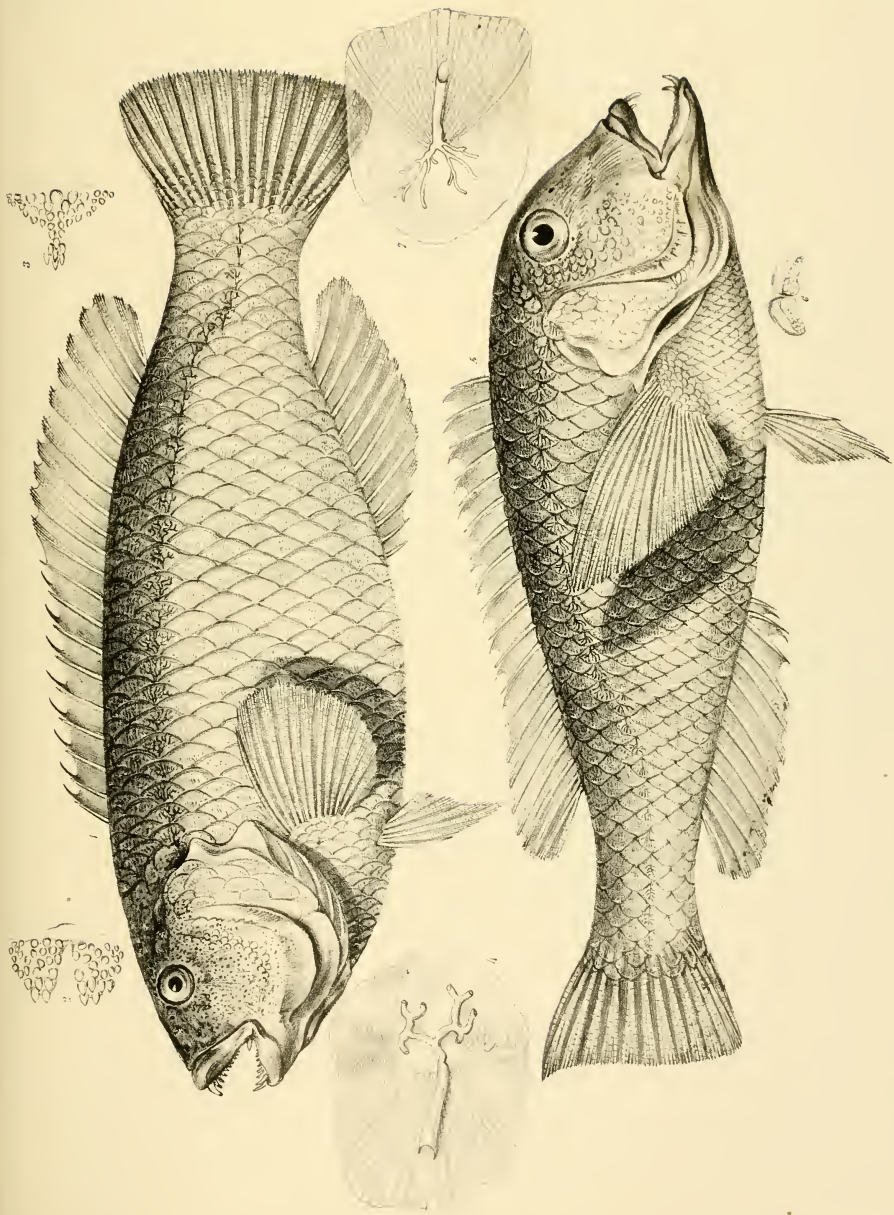






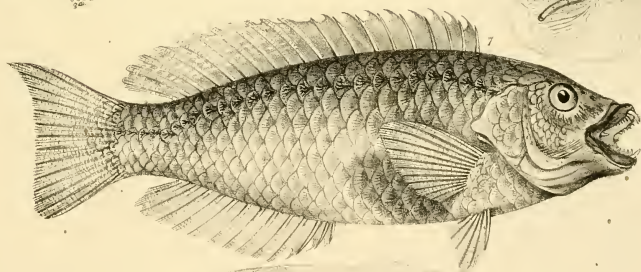
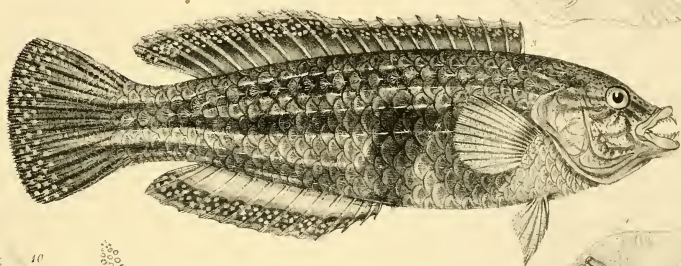
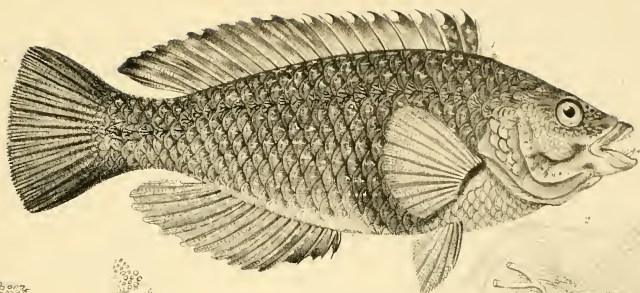






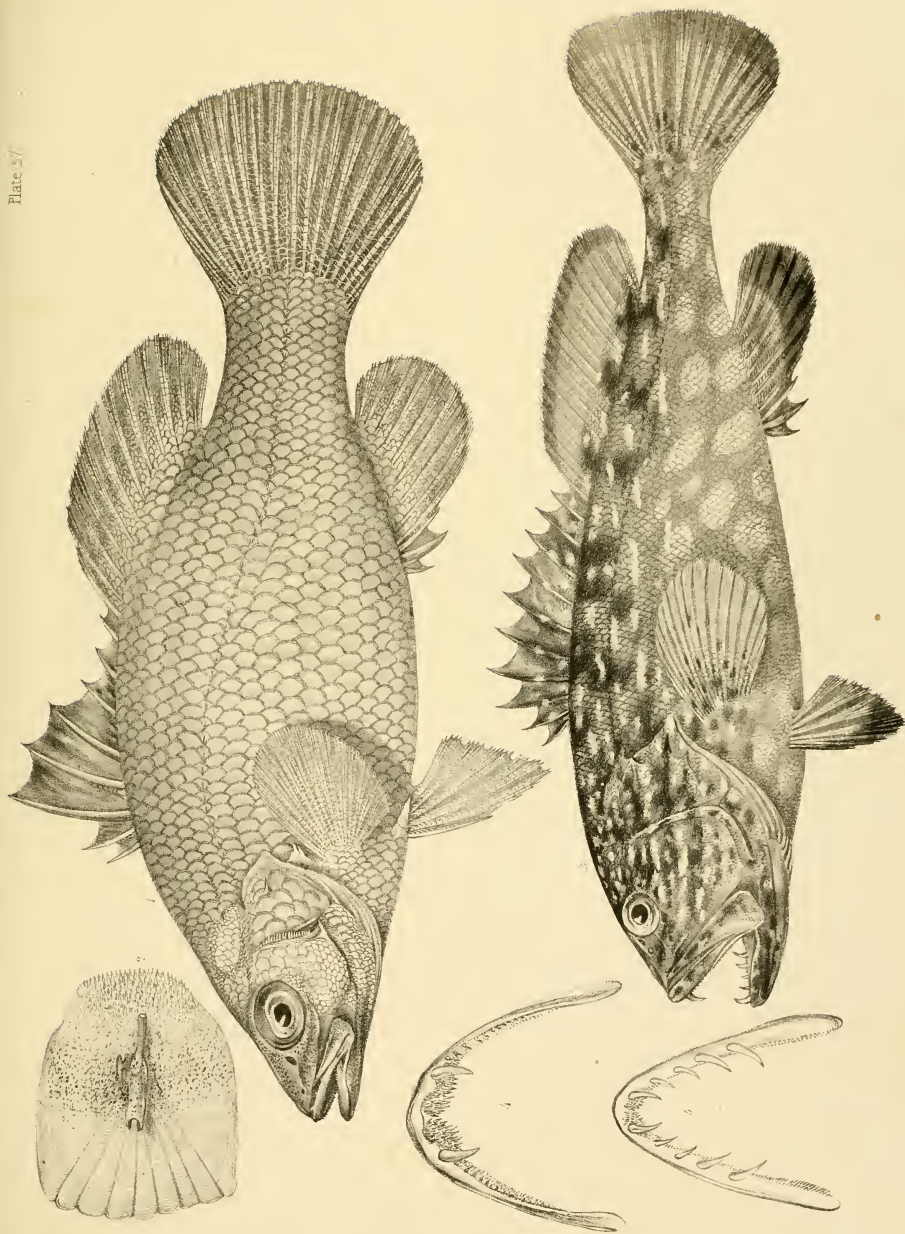




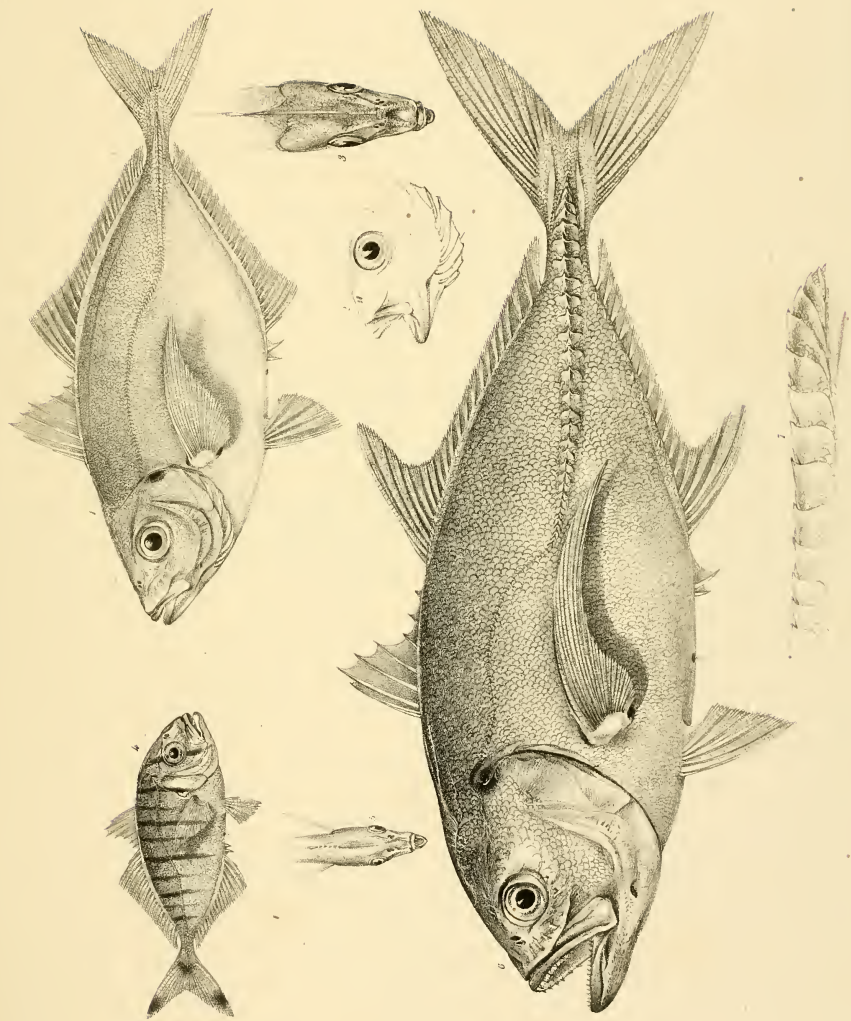






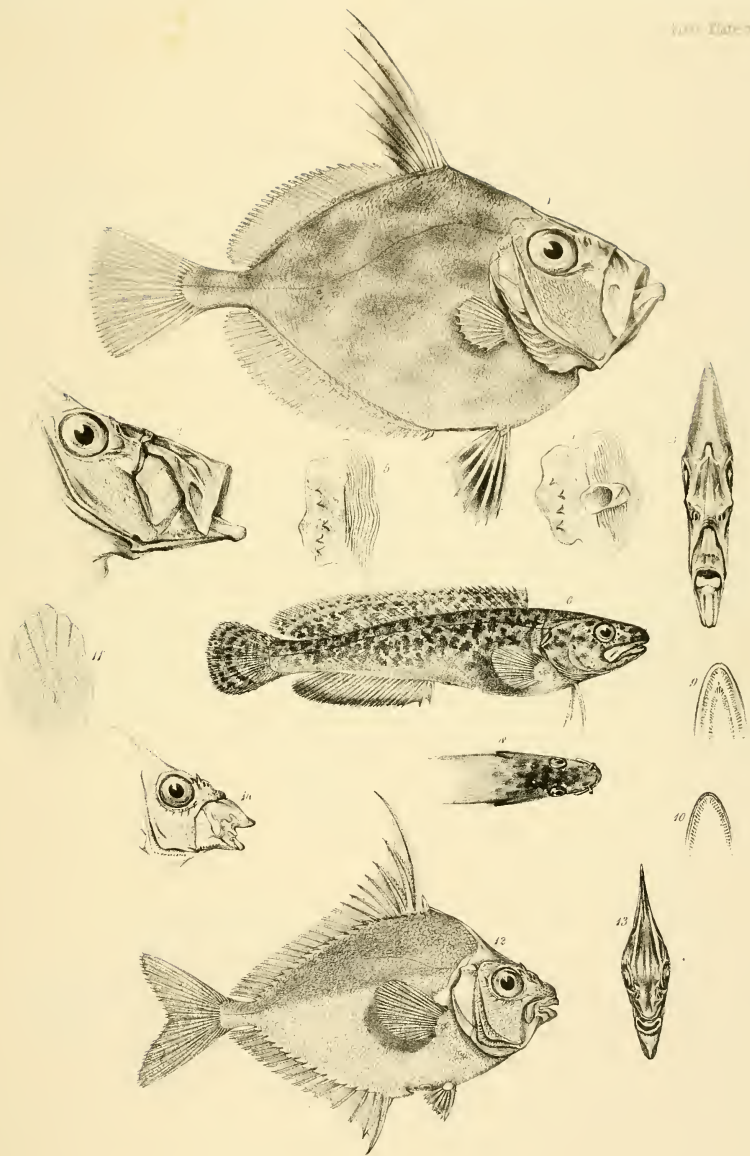










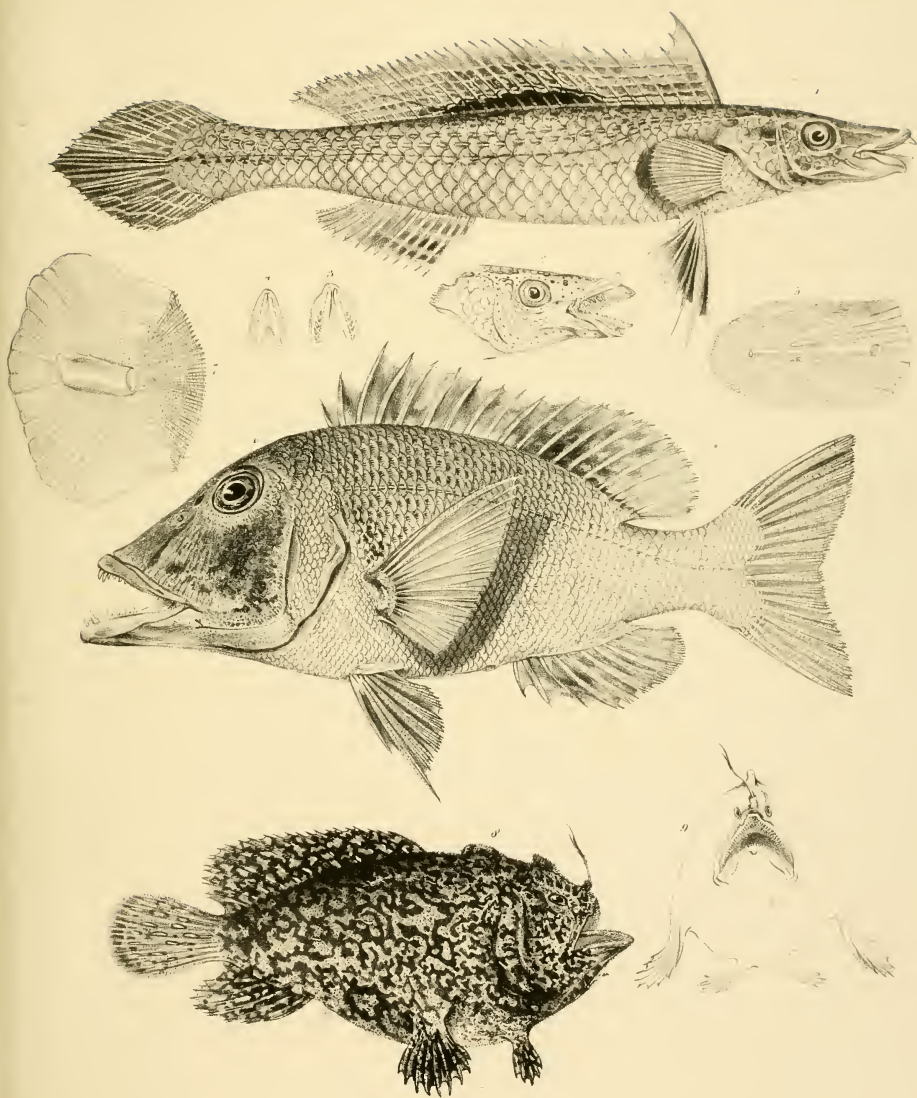


Drawn by W. Mitchell

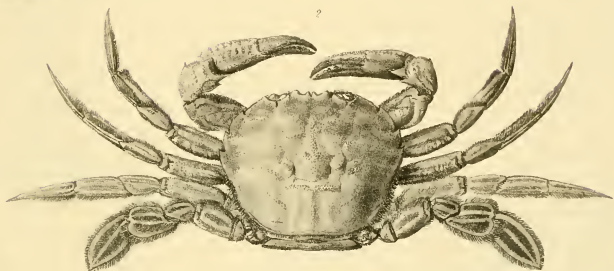
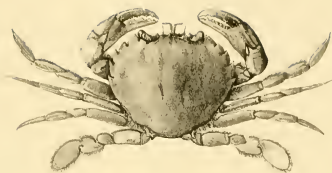
Hallmandel & Walton Lithographers

FIG. 1. CAPROIDES ADOTTIANUS. FIGS. 6-11. CAPROIDES MARMORATUS.  
FIGS. 12-14. EQUULA OPHRYLIIFERA.









59

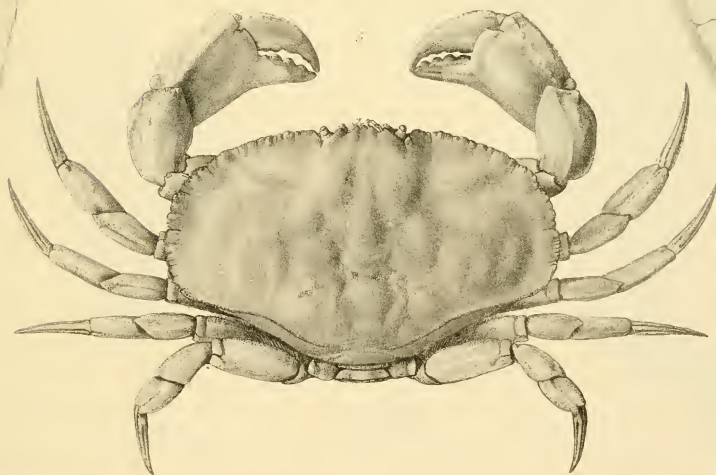


Illustration of a small crab.

Illustration of a small crab.

CRAB (CANCER) CRAB

AMERICAN

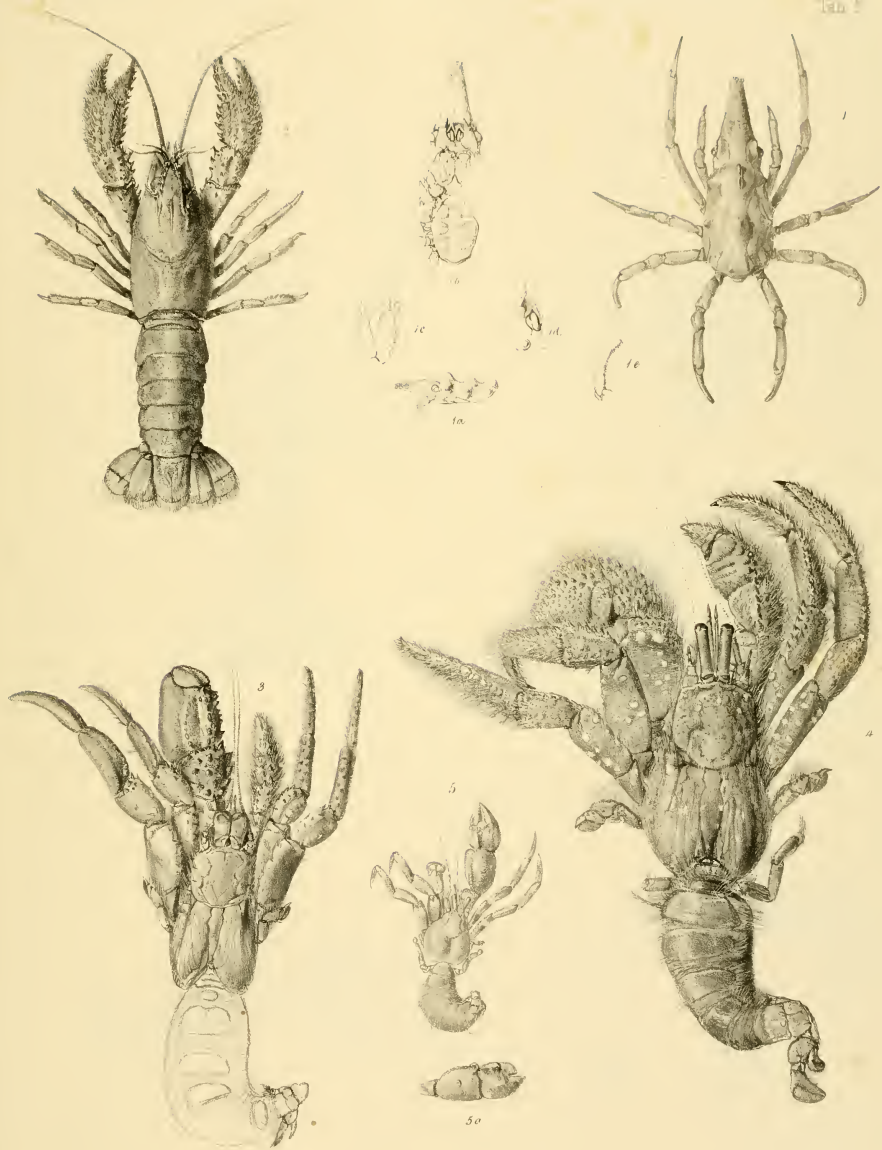
CRAB (CANCER) CRAB

SUN

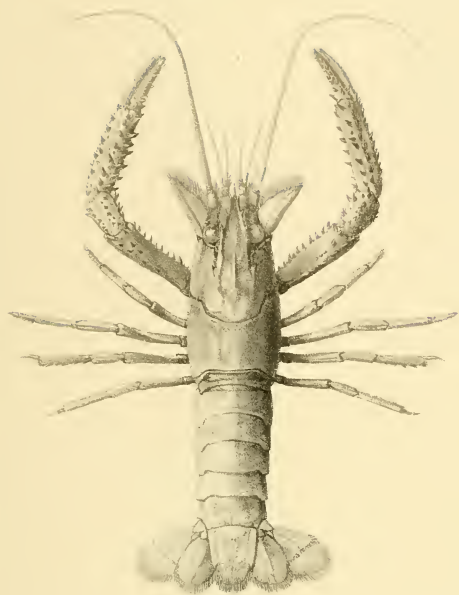
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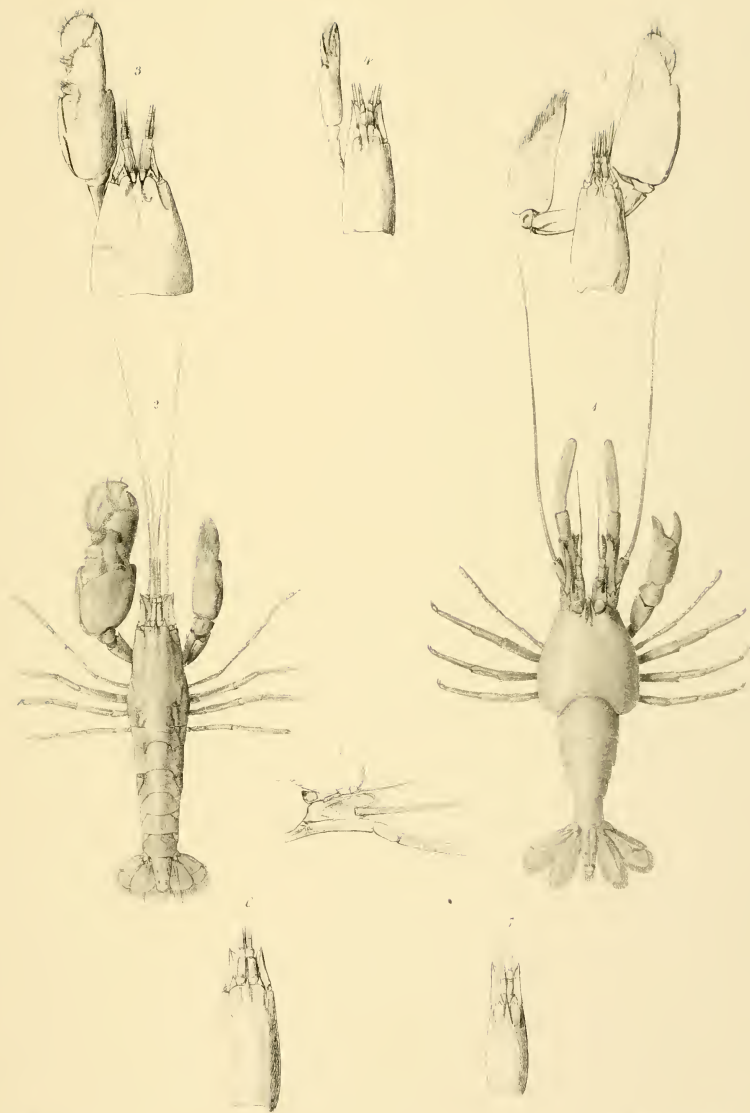


Hulmandel & Wachen

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6. ALPHEN. DOTO  
7. ALPHEN. DOTO

2. ALPHEN. DOTO  
6. ALPHEN. DOTO  
7. ALPHEN. DOTO





C. H. S. and J. S. P. sculp. Lith.

1. *CIENDELA LATECINCTA*

2. *CIENDELA FARRYI*

3. *DEMETRIDA LINEELLA*

4. *COPTERUS ROTUNDICOLLIS*

5. *HELODONTRECHUS ELAPHROIDES*

6. *BROSCUS CARENOIDES*

7. *FERONIA PLANIUSCULA*

8. *BROSCUS Q. L. P.*

9. *ELATER ACUTIFENNIS*

10. *ELATER LEVITHORAX*

11. *ELATER CINCTIGER*

12. *BOLEOTOPHAGUS ANTARCTICUS*

13. *OPATRUM TUBERCULICOSTATUM*

14. *ADFLIUM HARFALOIDES*





Rhilmündel: Farnst. Laboret.

1. EUCOMA ROSSII  
2. EUCOMA SQUAMIDORSIS  
3. MITOHEVLLUS IRROBATUS\*

5. ODONTRIA STRIATA  
6. CHEIROPLATYS TRUNCATUS  
7. STETHASPIS SUTURALIS  
8. ODONTRIA CINNAMOMEA

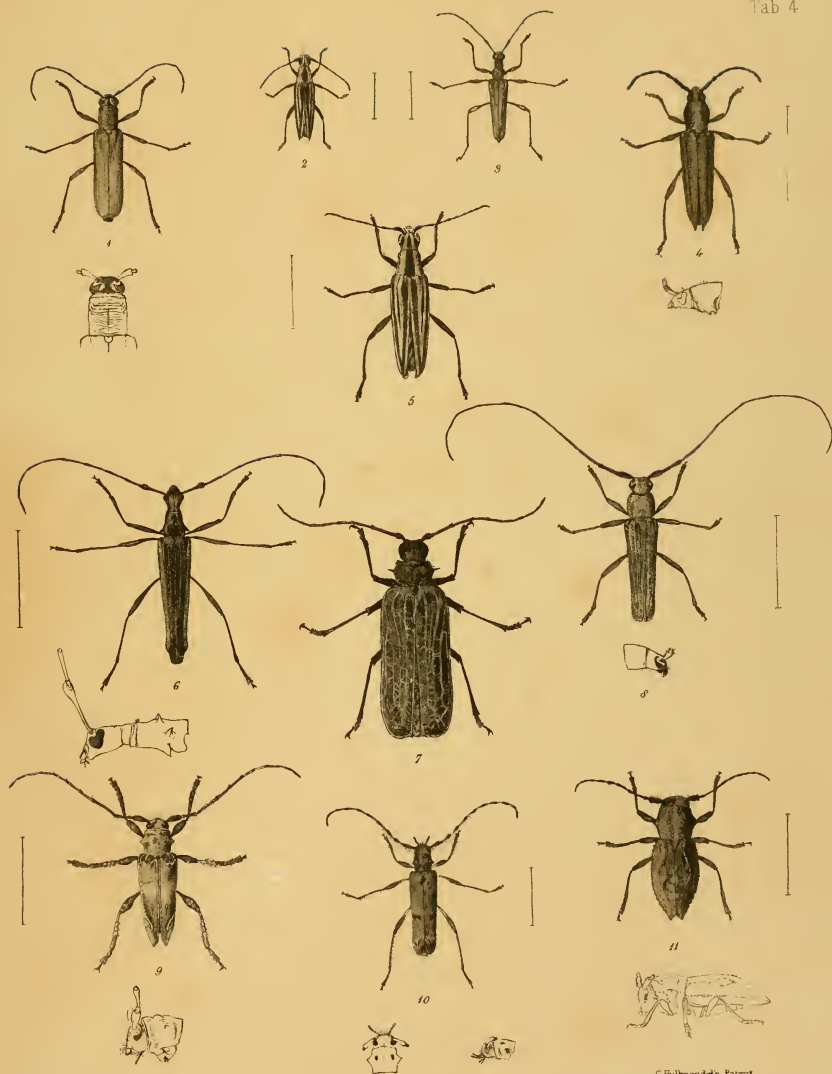
9. DENDROBLAX EARLIANUS\*  
10. " " ♀  
11. CHEIROPLATYS PUNCTATUS  
12. CHERODES TRACHYSCELIDES











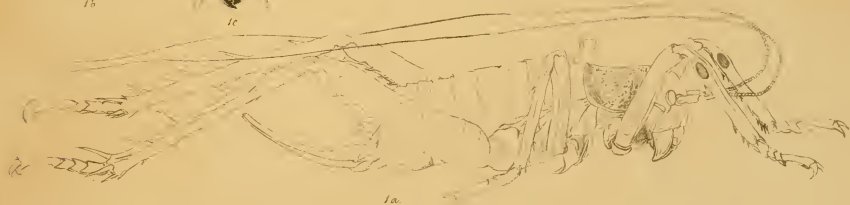
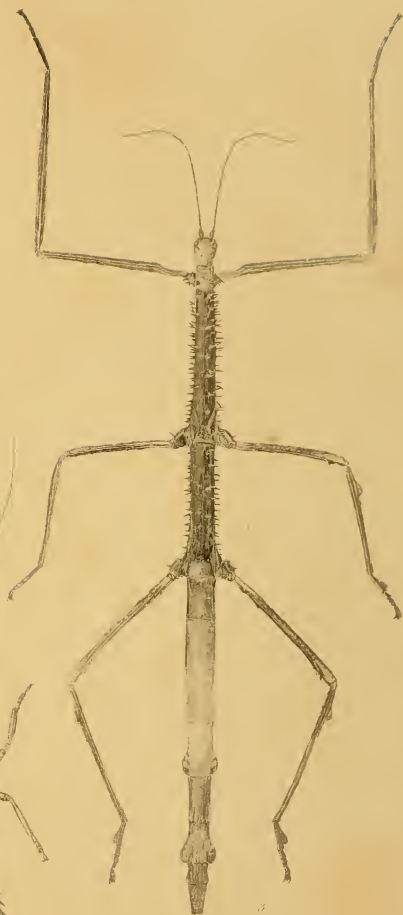
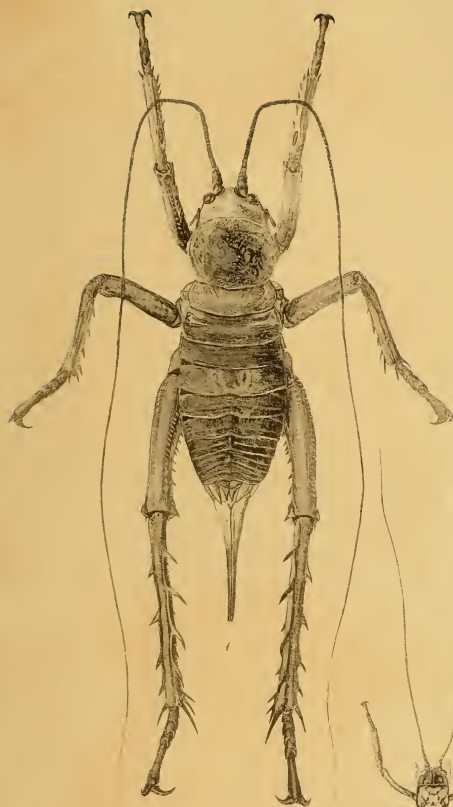
W Wang lithomat

C. Hulmandel's Parent.

1. *ISODERA VILLOSA*  
 2. *COPTOMMA ACUTIPENNE*  
 3. *CALLIPRASON SINCLAIRI*  
 4. *BRACHYTIRIA LATEBROSA* (var. *palmda*)  
 5. *COPTOMMA LINEATUM*  
 6. *CALLIPRASON MARGINATUM*  
 7. *PRIONOPLUS RETICULARIS*  
 8. *OPHTHYOPS FALLIDUS*  
 9. *TETROREIA CILIPES*  
 10. *AGAPANTHIDA PULCHELLA*  
 11. *DORCADIDA BILOCULARIS*

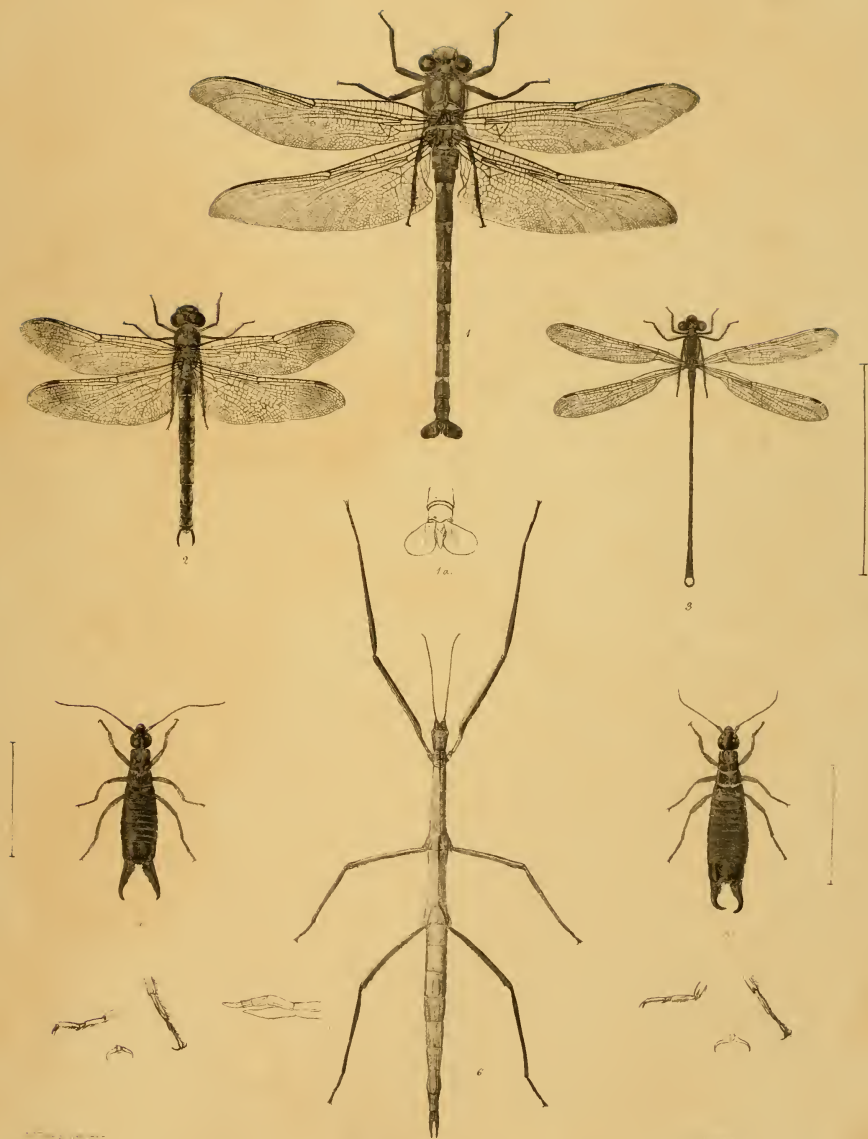






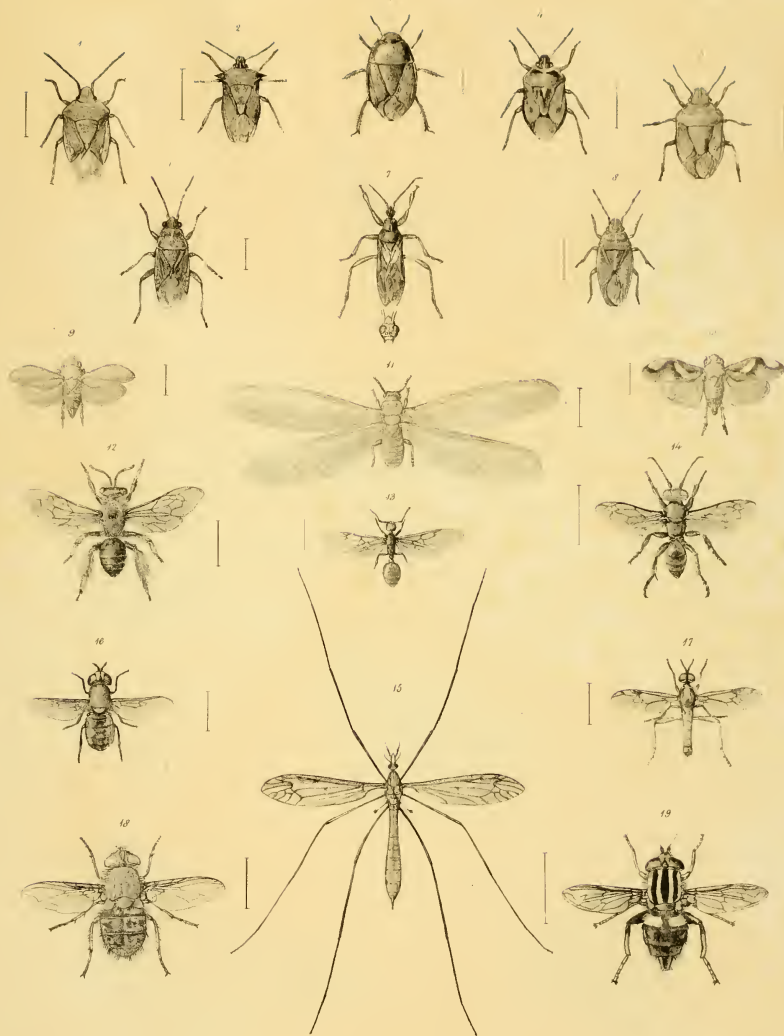
1a.





1. *Libellula ferox* 2. *Libellula ferox* 3. *Libellula ferox*  
 4. *Libellula ferox* 5. *Libellula ferox* 6. *Libellula ferox*





William, Wang del et lith

Hallman & Walter sculp

- |                              |                           |                       |                              |
|------------------------------|---------------------------|-----------------------|------------------------------|
| 1 ACANTHOSOMA BIMACULATUM    | 6 RHOPALUS ZEALANDICUS    | 11 TERMES INSULARIS   | 16 ODONTOMYIA DORSALIS       |
| 2 PENTATOMA (ARMA) ACULEATA  | 7 PIRATES EPHIPPIGER      | 12 ANDRENA TRICHOPIUS | 17 BERS APICALIS             |
| 3 CYDNUS LEPTOSPERMI         | 8 RHOPALIMORPHA OBSCURA   | 13 FORMICA ANTARCTICA | 18 MUSCA (GARCOPHAGA) LEMICA |
| 4 PENTATOMA (JALLA) DIFFINIS | 9 APHROPHORA SUBVIRESCENS | 14 ASTATA NIGERRIMA   | 19 ERISTALIS TRILINEATUS     |
| 5 STILOCORIS POLYSTICTICA    | 10 APHROPHORA TRIMACULATA | 15 TIPULA SENEX       |                              |



















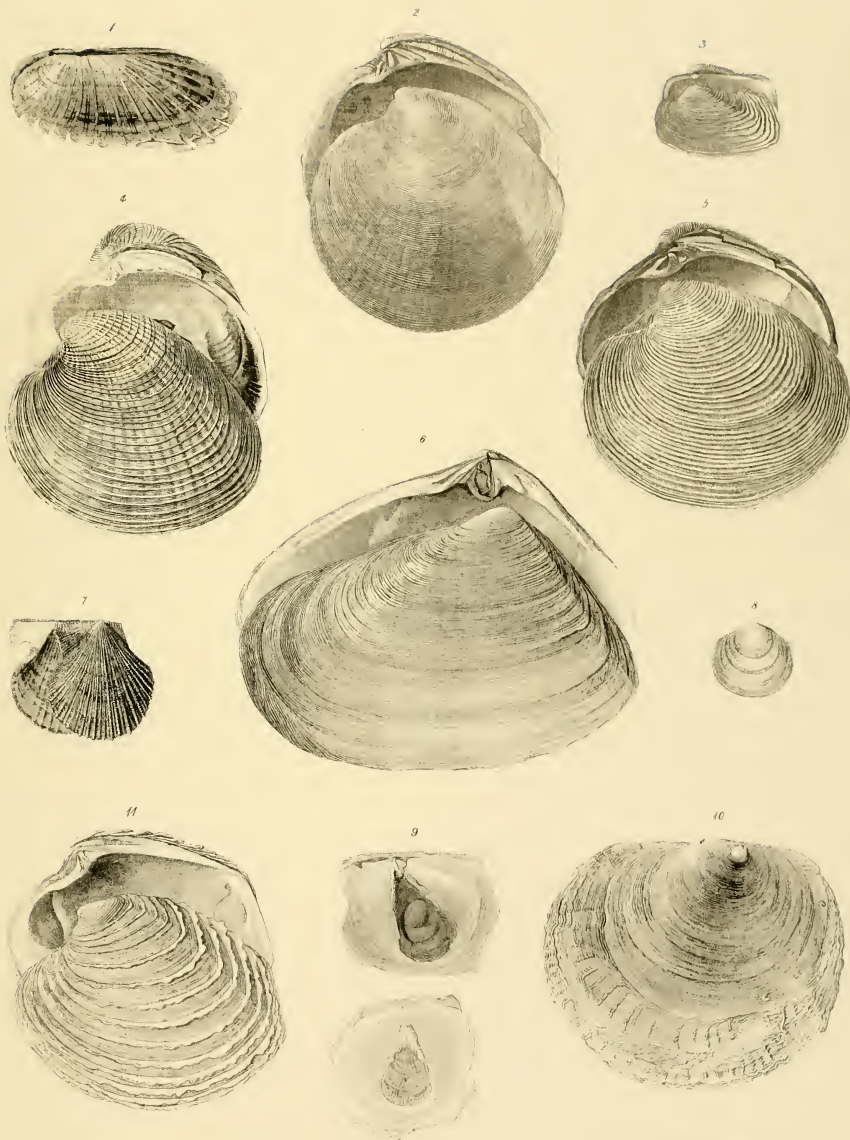






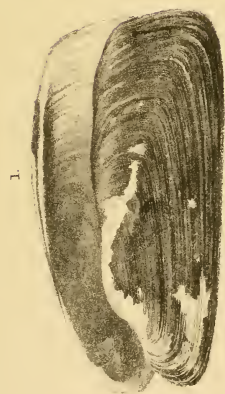








Tab. IV.



1.



2.



3.



4.



5.



6.



7.



8.



9.



10.



11.



12.



13.



14.



15.



16.



17.



18.



19.



20.



21.



22.



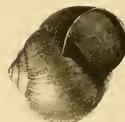
23.



24.



25.



26.



27.



28.



29.



30.



















